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The Resources Agency
DEPARTMENT OF WATER RESOURCES
Division of Operations and Maintenance

STATE WATER PROJECT ANNUAL REPORT OF OPERATIONS 1983



Gordon K. Van Vleck
Secretary for Resources
The Resources
Agency

George Deukmejian
Governor
State of
California

David N. Kennedy
Director
Department of
Water Resources

FOREWORD

This is the tenth in a series of annual reports summarizing the water and energy operation of the California State Water Project (SWP). This report summarizes the operation of Project facilities during 1983, and includes revisions to the data published in the monthly "State Water Project, Report of Operations".

A handwritten signature in cursive script, reading "L. A. Mullnix".

L. A. Mullnix, Chief
Division of Operations
and Maintenance

State of California
GEORGE DEUKMEJIAN, Governor

The Resources Agency
GORDON K. VAN VLECK, Secretary for Resources

Department of Water Resources
DAVID N. KENNEDY, Director

JOHN P. CAFFREY
Deputy Director

ROBERT G. POTTER
Deputy Director

ROBERT E. WHITING
Deputy Director

SALLE S. JANTZ
Assistant Director

SUSAN WEBER
Chief Counsel

DIVISION OF OPERATIONS AND MAINTENANCE

Lawrence A. Mullnix Division Chief

John R. Eaton Chief of Operations

This report was prepared under the direction of

Gerald C. CoxChief, Operations Control Office

by

James D. Spence Section Chief,
Project Records and Reports Section
Richard G. Fields Water Resources Engineering Associate
Michael Nolasco Water Resources Technician II
Mutaz B. Mihyar Junior Civil Engineer
Stacey L. Fong Programmer I
Jerry S. Lau Student Assistant
Janet Bowers Student Assistant

Assisted by

Nylene Freitas Office Technician
Marilyn P. Williams Senior Stenographer
Anne Foster Word Processing Technician
Dave Lane Computer Graphics Specialist

Drafting by

Dale Walker Supervisor, Drafting Services
Dave Hammons Senior Delineator
Mike Serna Delineator
Dana Peterson Drafting Aid II
Kathy Ito Drafting Aid I
Judy Santillan Student Assistant

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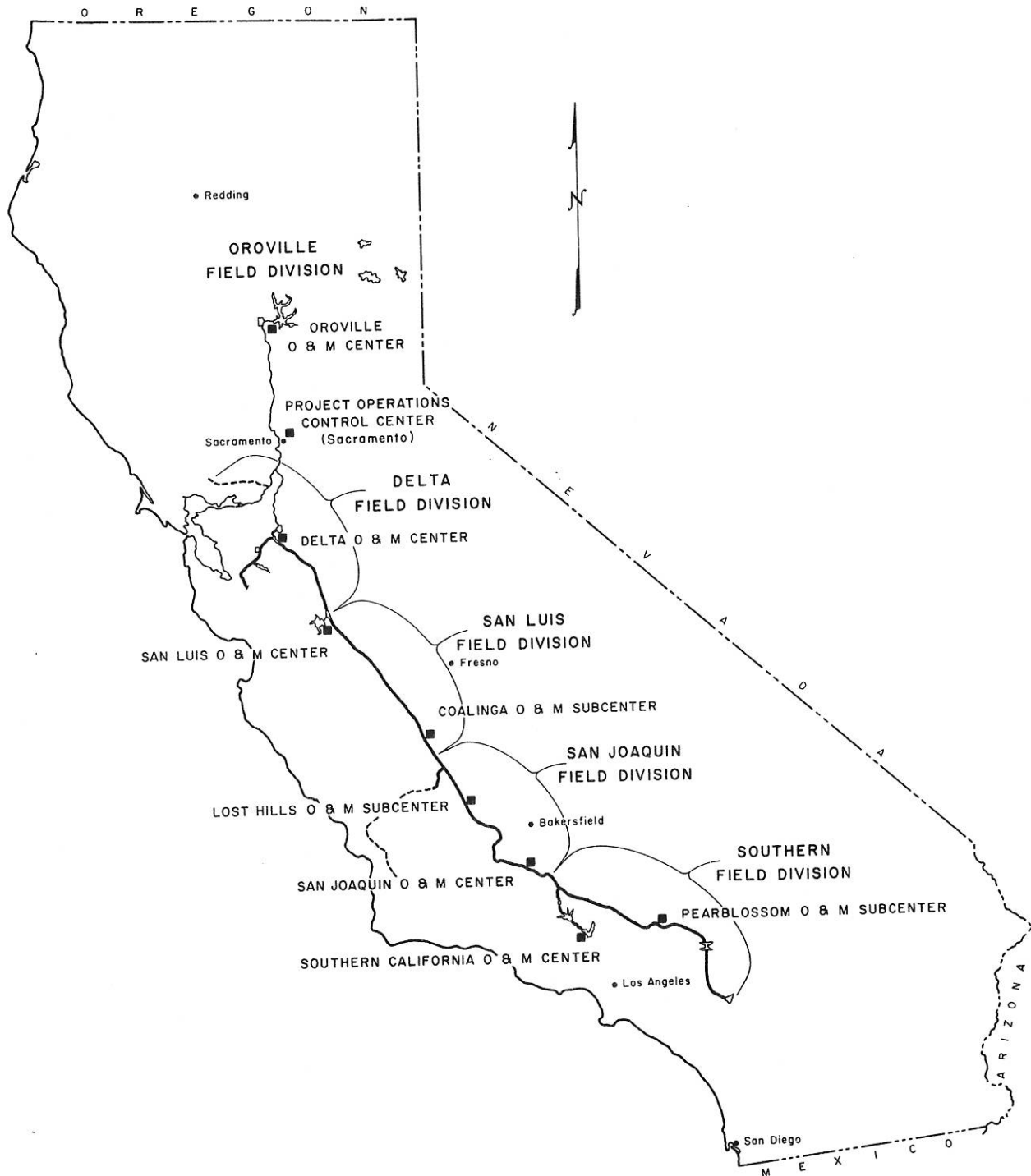
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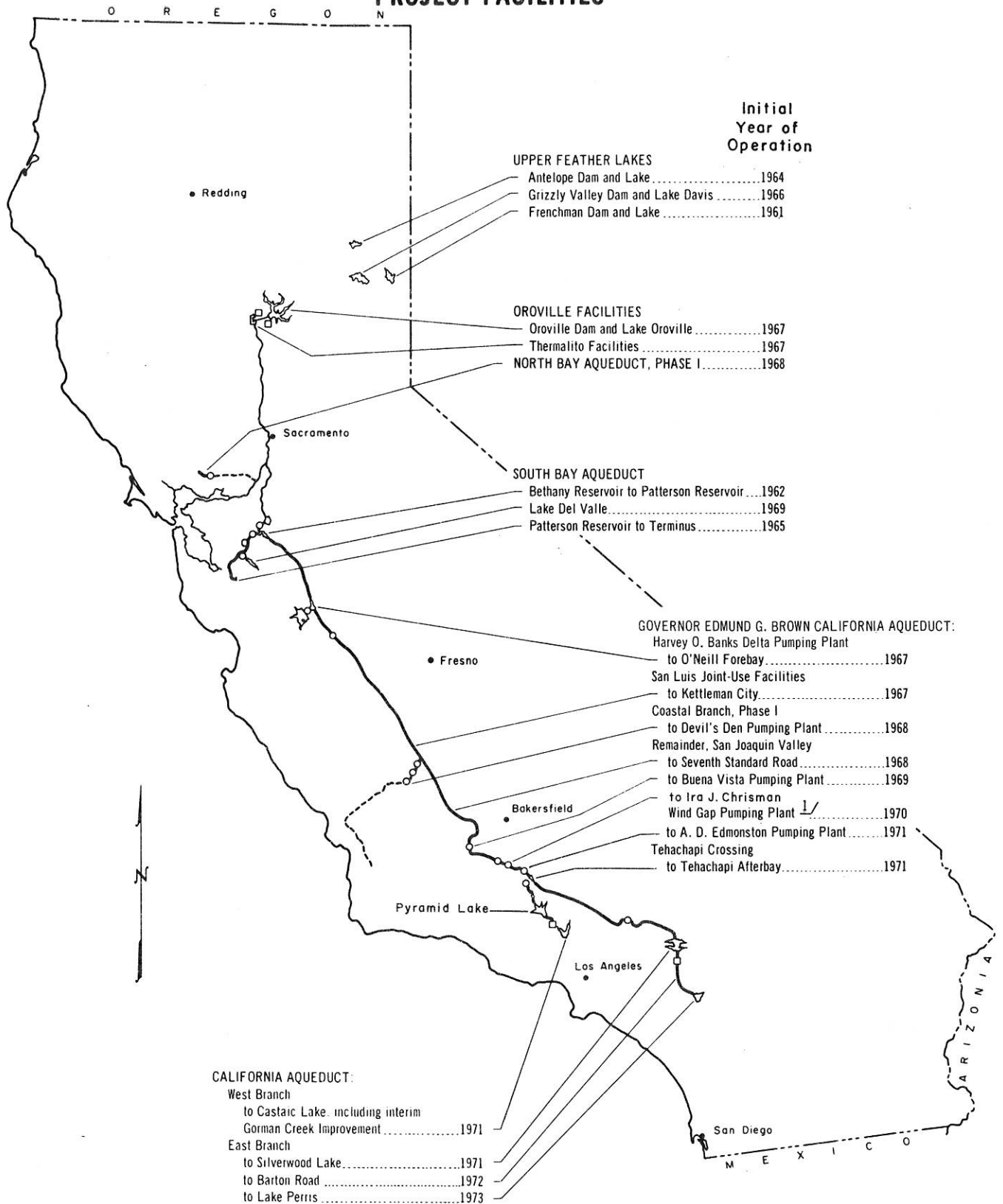
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MAP 1 FIELD DIVISION BOUNDARIES



MAP 2 PROJECT FACILITIES



^{1/} This title became effective on Jan. 9, 1986.

INTRODUCTION

This 1983 Annual Report of Operations for the SWP is divided into eight parts. The first six parts, "Highlights of 1983 Operation", "Water Quality Standards", "Water Conditions", "Water Operations", "Energy Operations", and "Project Status in 1983", cover conditions and events of statewide significance, in detail where appropriate and in summary when the item is discussed in more detail in the following sections. The seventh part, "Sacramento-San Joaquin Delta Operations", gives special emphasis to Delta operations, a key aspect of the State Water Project. The last part, "Project Operations", provides further detail on operational conditions and activities, including outages, by field division.

The report also includes seven additional sections, tabulating and depicting Project operations. Section I covers water deliveries. Sections II through V cover operations of the Governor Edmund G. Brown California Aqueduct, Project pumping plants, San Luis Joint-Use Facilities, and Project reservoirs. Section VI covers energy operations. Section VII covers various types of water quality measurement analyses for selected stations throughout the Project.

Highlights of 1983 Operation

The 1982-83 water year was a very wet year. California experienced record-breaking precipitation amounts in most river basins of the State during the 1982-83 water year (October 1, 1982 through September 30, 1983). Snow accumulation and subsequent snowmelt runoff reached record highs for many watersheds. Snow

water equivalent registered all-time highs during the spring season, and reservoir storages were well above average throughout the water year. As a result, demands for SWP water were reduced substantially. Deliveries of entitlement water to long-term contractors were approximately half of the 1983 deliveries requested in the fall of 1982.

Following the termination of the 1967 Oroville-Thermalito power sale contract, and the 1966 power supply contract, the Department of Water Resources (DWR) began operation as a bulk power agency on April 1, 1983, assuming independent control of its power facilities. Responsibility for matching loads and resources accompanied integration with the Western system electric grid and the opportunity to take advantage of bulk power markets.

Energy sale revenues of nearly \$90 million in 1983 contributed to lowering the net energy costs of project pumping. Energy surplus to SWP requirements was marketed on an hourly basis at rates competitive with other energy available to California utilities. Preparations for the new mode of operation, which included many coordination meetings, orientations, training sessions, and the development of new operation procedures enabled the Department staff involved to make the transition a relatively smooth one. Additional information on Project energy operations is presented in the Energy Operations Section on page 11.

WATER QUALITY STANDARDS

From 1976 through 1978, the SWP was governed successively by at least seven different sets of water quality standards for the Sacramento-San Joaquin Delta. This was due mostly to the pronounced changes in hydrologic conditions leading into and out of California's record drought of 1977 and led, finally, to the adoption by the State Water Resources Control Board in August 1978 of Water Right Decision 1485 (D-1485). This decision established water quality standards for the Delta and Suisun Marsh. As described in more detail under Sacramento-San Joaquin Delta Operations, all Delta water quality standards were easily met in 1983.

WATER CONDITIONS

Based on criteria in D-1485, the 1982-83 water year was classified as a "wet" year. The final determination of year classification is made in May, based on current water year forecasts of the Sacramento Valley unimpaired runoff for the sum of the following locations: Sacramento River above Bend Bridge, near Red Bluff; Feather River, total inflow to Lake Oroville; Yuba River at Smartville; and the American River, total inflow to Folsom Lake. The May 1 forecasted (and actual, in parentheses) combined unimpaired runoff for these basins was 38,300,000 (37,492,000) ac-ft for the 1982-83 water year, which at 217 (212) percent of average¹ for the four basins, is the largest of the 78 years for which data are available.

¹ Unimpaired runoff and precipitation averages are based on the 50-year period 1931-1980. Snowpack averages are based on the 45-year period 1931-1975.

Actual unimpaired runoff for the 1982-83 water year was well above average throughout California. Unimpaired runoff for the water year was 225 percent of average, ranging from 187 percent of average in the Colorado Desert hydrographic area to 383 percent of average in the Central Coastal hydrographic area. Total volumes for the water year in the Central Valley surpassed average volumes by over 36 million ac-ft.

In the Feather River Basin, the primary source of supply for the SWP, water year total precipitation was 173 percent of average, and the total unimpaired runoff for 1983 was 213 percent of average. Maximum snowpack water equivalent¹ was 213 percent of average.

Statewide precipitation to May 1, during the 1982-83 water year, was about 190 percent of average, compared to 150 percent of average for the corresponding 1981-82 period. Precipitation in all hydrographic areas was well above average. Hydrographic areas representative of these conditions are:

- o Sacramento Valley - 185% of average
- o San Joaquin Valley - 205% of average
- o South Coastal - 210% of average

May 1 snow surveys showed snow-stored water amounts that reached all-time record amounts on the majority of snow courses measured. Snowpack water equivalent measurements in Sacramento Valley watersheds were about 275 percent of average. San Joaquin Valley watersheds were even higher at about 320 percent of average.

¹ Snowpack water equivalent is the amount of water contained in snow samples using selected snow courses and sensors.

WATER OPERATIONS

Reservoir Operations

On January 1, 1983, storage in SWP reservoirs was close to average. Lake Oroville storage was above average, and in fact spilling, but San Luis Reservoir was well below average because of the 1982 storage restrictions for repair of the September 1981 dam embankment slide damage. Abundant winter and spring runoff allowed San Luis Reservoir to be refilled by early May, adding over 1.5 million ac-ft to total storage during the first five months of 1983. Local water supplies in Southern California were below normal. However, with the large runoff available from the Central Valley for the 1982-83 water year and completion of the repair of San Luis Dam, total combined storage in the Project's seven major reservoirs at the end of 1983, increased by over 755,000 ac-ft (20 percent) over 1982 end-of-year storage. These seven reservoirs are Lake Oroville, Lake Del Valle, San Luis Reservoir, Silverwood Lake, Lake Perris, Pyramid Lake, and Castaic Lake.

Lake Oroville reached its normal maximum operational storage of 3,512,983 ac-ft on June 19. Minimum Lake Oroville storage was 2,728,149 ac-ft on November 4. Total inflow to the Lake in 1983 was 9,812,282 ac-ft. Lake Oroville was operated for flood control during much of the year, and from January to April, there were 51 days of spill operations, with a total volume of 1.6 million ac-ft of controlled spill, a record amount. Additional information is given in the Project Operations, Oroville Field Division Section on page 30.

On March 3, Lake Del Valle reached its maximum storage of the year at 51,087 ac-ft. The minimum storage of 26,333 ac-ft for the Lake was reached on November 20.

SWP storage in San Luis Reservoir ranged from a low of 271,959 ac-ft on January 1, up to a high of 1,070,996 ac-ft on March 25.

Maximum and minimum storage values for the southern reservoirs in 1983 were:

	Maximum Operating Storage (ac-ft)	1983 Maximum (ac-ft)	Date	Minimum Operating Storage (ac-ft)	1983 Minimum (ac-ft)	Date
<u>West Branch</u>						
Castaic Lake	323,702	325,266	3/1	18,590	266,459	9/19
Pyramid Lake	169,901	167,178	4/17	4,798	131,904	10/7
<u>East Branch</u>						
Silverwood Lake	73,032	74,853	3/31	39,211	27,312	10/17
Lake Perris	126,841	126,933	3/18	37,013	107, 928	8/18

Aqueduct Operations

The North Bay Aqueduct and the South Bay Aqueduct operations in 1983 were routine, but operations of the California Aqueduct was not. Diversions at the Harvey O. Banks Delta Pumping Plant were relatively heavy in January through early March, as San Luis Reservoir was being refilled. Reduced demands and diversions via the Kern River Intertie resulted in much lower than normal Delta diversions during the remainder of the year.

Use of the Kern River Intertie in 1983 far exceeded that of the previous operations. Except for a total of 28 days, the Intertie

was in operation the entire year. More than 750,000 ac-ft of flood water were carried into the Aqueduct in 1983, including excess Kaweah and Tule River water diverted via the Friant-Kern Canal.

To help relieve flooding in the Tulare Lake Basin, The Metropolitan Water District of Southern California (MWDSC) decreased its diversion of Colorado River water in February, March, May, and June, and increasing its use of SWP water in these months by about 87,000 ac-ft. This allowed additional flood water to be diverted into the California Aqueduct.

A pump back operation, under which water from the Intertie was pumped north through the Aqueduct, began at the end of March. Installation of temporary pumps at Checks 25, 23, 22, and 20 allowed approximately 250,000 ac-ft of Intertie water to be delivered as far as 80 miles northward.

Water Deliveries

Project water supplies in 1983 were sufficient to meet all water service contractor requests for SWP water deliveries.

Water deliveries from SWP facilities in 1983 totaled 1,304,547 ac-ft, including local water deliveries and excluding deliveries to satisfy prior water rights and federal customers. This is a decrease of 36 percent from the water deliveries made during 1982.

In addition to entitlement water and local water, deliveries were made for various other purposes in 1983. A table of water deliveries by water type is given on page 28. These various water types are discussed below.

In September 1982, nine contractors submitted estimates that they could use a total of 659,803 ac-ft of surplus water during 1983. In January, DWR announced that all surplus water requests could be satisfied. However, the wet spring weather and reduced plantings due to the federal "Payment-in-kind" agricultural program caused substantial reductions in the need for surplus water. The total surplus water delivered during 1983 was 13,019 ac-ft, which was delivered to only one contractor.

Under water supply contract Article 7 (South Bay contractors) or Article 45 (San Joaquin contractors), SWP contractors can acquire credits for future deliveries if above-normal supplies of local water reduce their needs for SWP water, as long as the sum of current annual entitlement plus "wet-weather" water do not exceed a contractor's maximum annual entitlement at the time of delivery. As of January 1, 1983, six contractors had acquired credits totaling 216,050 ac-ft for future delivery of entitlement water under the wet-weather provisions of their contracts. During 1983, the County of Kings took delivery of the 750 ac-ft of Article 45 water for which it had acquired a credit in 1982.

As described previously under "Aqueduct Operations", more than 750,000 ac-ft of flood water were diverted into the California Aqueduct via the Kern River Intertie in 1983. Most of this water was stored or delivered under normal SWP operating procedures, replacing water which otherwise would have been pumped from the Delta. To provide additional beneficial use of flood waters and relief of flooding in the Tulare Lake Basin, DWR,

MWDSC, and Delta Lands Reclamation District No. 770 (Delta Lands) signed a letter agreement on February 15, 1983. Under this agreement, MWDSC reduced its deliveries of Colorado River water in February and March, and took delivery of 28,464 ac-ft of Intertie water. Also, under a similar agreement signed February 28, 1983, between DWR, Delta Lands, and the Mojave Water Agency (MWA), a total of 34,356 ac-ft of Intertie water was released to the Mojave River in February and March. MWA used 24,489 ac-ft of this water for ground water recharge and 9,867 ac-ft flowed past the recharge area during a period of high local runoff.

The 1977 emergency relief water program (described in detail in Bulletin 132-83, page 86), resulted in 95,176 ac-ft of undelivered exchange water being held in SWP reservoirs for emergency relief of future drought conditions. Two non-SWP contractors (Green Valley Water District and Tracy Golf and Country Club) purchased a total of 650 ac-ft of this stored water and took delivery in 1978 and 1979. Also in 1978, Kern County Water Agency (KCWA) purchased 94,526 ac-ft (the remaining stored water) for delivery before December 31, 1983. In 1983, 605 ac-ft of KCWA's 1977 emergency relief water was delivered, leaving a balance of 21,521 ac-ft undelivered. At KCWA's request, an agreement was made to extend the delivery deadline to December 31, 1986.

The first of two ground water demonstration programs initiated in 1978 was completed in 1982 for the Mojave Water Agency as described in Bulletin 132-83, page 87. The second program was established in 1978 under agreements between DWR and

the San Bernardino Valley Municipal Water District (SBVMWD). Under this program, total water stored as of December 31, 1983, was 18,749 ac-ft, which includes 681 ac-ft added to the basin in January 1983.

During 1983, a total of 3,275 ac-ft of recreation water was delivered for use at public recreation facilities at Lake Del Valle, San Luis Reservoir, O'Neill Forebay, Silverwood Lake, Pyramid Lake, Castaic Lake, and Lake Perris. Also, during 1983, a total of 381 ac-ft was conveyed to about 830 acres of wildlife mitigation lands located below O'Neill Forebay at the Pilibos Wildlife Area as mitigation water.

The 1983 repayment water is discussed in detail in the San Joaquin Field Division Section on page 42.

Water delivered to federal customers from the joint-use facilities totaled 1,269,906 ac-ft for the year. This is about four percent lower than deliveries made in 1982. This amount excludes 359 ac-ft of recreation and mitigation water and includes 364 ac-ft of Central Valley Project (CVP) water wheeled for the USBR by the SWP. For a more detailed description of federal deliveries, see page 39, and for SWP wheeling of CVP water, see pages 35 and 39.

Water delivered from SWP facilities to satisfy prior water rights within the Feather River Service Area totaled 601,967¹ ac-ft. This is about 79 percent of the amount delivered in 1982.

¹ From Lake Davis (797 ac-ft), Palermo Canal (6,761 ac-ft), and Thermalito Afterbay deliveries (594,409 ac-ft).

In 1983, no unscheduled water was declared available by the Department because enough surplus water was sufficient to satisfy all requests. Unscheduled water, known as extra surplus water prior to 1981, is water in excess of that required to meet Delta water quality standards and all SWP scheduled deliveries.

A summary of water deliveries from SWP facilities by years to individual agencies is shown on page I-2

ENERGY OPERATIONS

In 1966, DWR signed the "Suppliers" Contract with Pacific Gas and Electric Company (PGandE), Southern California Edison Company (SCE), Los Angeles Department of Water and Power (LADWP), and San Diego Gas and Electric Company (SDG&E). The Suppliers Contract, which provided energy for all SWP requirements not covered from other sources and for transmission of all energy used by SWP plants, was terminated effective March 31, 1983. On the same date, the Oroville-Thermalito Power Sale Contract was also terminated. This 1967 contract provided for the sale of all output of Edward Hyatt and Thermalito Powerplants to PGandE, SCE, and SDG&E. March 31, 1983 was also the expiration date of 1967 contracts with the City of Seattle, City of Tacoma, and Puget Sound Power and Light Company for purchase of Canadian Entitlement Power. Purchase under these contracts had furnished 11 percent of the total SWP pumping energy consumed from 1968 through 1982.

On April 1, 1983, DWR began operation as a bulk power agency, utilizing a mix of owned, contracted, and purchased energy resources to meet SWP needs via contracted transmission capacity, and selling temporary excesses of such resources.

Although 1983 was a mixed energy operations year as described above, we will continue to use the terms "Energy Sources" and "Energy Uses" throughout this report. Also, the values used for total energy sources and total energy uses, as well as values of Section VI, do not reflect the losses associated with transmission of energy, and represent data as it was obtained from the meters.

Energy Sources

Energy generation from the SWP's six hydroelectric plants (Hyatt, Thermalito, San Luis, William E. Warne, Castaic, and Devil Canyon) during 1983 grossed 5,455,955 megawatthours (MWh) (see Figure M, page VI-1). This is a six percent increase over that generated in 1982. Monthly generation totals for each plant are shown in Section VI.

Edward Hyatt and Thermalito Powerplants constituted the largest single source of SWP energy in 1983, with 4,940,728 MWh generated. This is over twice the estimated average production at these plants and the largest annual output since operation began in 1968.

In contrast, combined energy generation at the SWP energy recovery plants (San Luis, William E. Warne, Castaic, and Devil Canyon) was the lowest since the wet year of 1974, even though 1983 was the first full-year's generation for William E. Warne Powerplant. Generation at these recovery plants varies with the amount of water conveyed through the California Aqueduct and 1983 energy output reflected the reduced pumping energy consumption.

Unit 1 of the Pine Flat Powerplant began furnishing energy to the SWP in November 1983 during initial testing and operation. DWR receives all of the output of this plant under a 50-year contract with the Kings River Conservation District.

In April 1983, the SWP began receiving energy under contract from five small hydroelectric facilities owned and operated by MWDSC. DWR has exchange arrangements with SCE and LADWP to facilitate transmission of this energy.

The 1979 DWR-SCE Power Contract also went into effect in April 1983. Under this contract, part of the Hyatt-Thermalito Powerplants' generation and all of the output of Devil Canyon Powerplant are delivered to SCE. The energy is generally delivered during on-peak periods and a greater amount of energy is returned during off-peak periods. The net gain to the SWP during the nine months this exchange was in effect in 1983 was over 800,000 MWh.

Operation of Reid Gardner Unit No. 4 began in June 1983, with commercial operation being declared on July 26, 1983. Since DWR did not need its share of the energy generated during start-up of the unit, Nevada Power Company agreed to bank energy generated prior to July 15, 1983. The SWP received over 400 thousand MWh from Reid Gardner Unit No. 4 during 1983. Deliveries to the coal stockpile for Reid Gardner Unit No. 4 began in late 1982. When the unit began commercial operation in July 1983, the stockpile had reached 142,000 tons. Despite disruptions from an earth slide on the railroad line serving the plant, coal deliveries were sufficient to provide a stockpile of 255,000 tons by December 31, 1983.

DWR has a contract with TERA Corporation for purchase of the energy from two hundred 50-kW wind turbines to be constructed at Bethany Wind Park near the South Bay Pumping Plant. Sixty wind turbines were operational at the end of 1983, and delivered 2,910 MWh directly to the Pumping Plant in 1983.

For the first three months of 1983, most of the energy needed for SWP operation was purchased under the Suppliers Contract and Canadian Entitlement Power contracts. Starting April 1, 1983, contracts with Pacific Power and Light Company and Portland General Electric Company supplied 300 MW of firm power to the SWP. The energy supplied, totaling about 1,400,000 MWh, was delivered via DWR's contracted 300 MW of transmission capacity in the extra high voltage (EHV) Pacific Northwest Intertie. In addition, small amounts of surplus energy were purchased from the Bonneville Power Administration at times during 1983 when it was economically advantageous.

Energy Use

Total energy use for SWP pumping during 1983 was 2,764,395 MWh, including 268,864 MWh for system losses, which is the lowest for any year since the 1977 drought and only 50 percent of that used in 1982. The principal reason for the reduced energy requirements in 1983 was that MWDSC had available substantial amounts of water and energy from the Colorado River and elected to reduce its deliveries from the SWP. The wet weather in 1983 and the "Payment-in-Kind" agricultural program also reduced demands for SWP water in the agricultural San Joaquin Valley by about 40 percent from 1982 levels. In

addition, over 750,000 ac-ft of total flood water was diverted into the California Aqueduct via the Kern River Intertie, saving over 300,000 MWh that would have been required to pump an equivalent quantity of water from the Delta.

During the first three months of 1983, the energy produced by Edward Hyatt and Thermalito Powerplants was delivered to PGandE, SCE, and SDG&E under the 1967 Oroville-Thermalito Power Sale Contract. During the remainder of the year, SWP energy supplies (including substantial purchases under contractual obligations) exceeded SWP needs and DWR sold the excess under power sale contracts to eight utilities.

The total sale of energy during the last nine months of 1983 was 5,077,620 MWh. The total revenue from energy sales during the last nine months of 1983 slightly exceeded expenditures for bulk energy purchases and transmission services during the same period. This reflects only the cash transactions during 1983 and is not directly indicative of the true net cost of SWP energy, which includes such other costs as:

- o debt service and operation, maintenance, and replacement (OM&R) costs associated with SWP-owned hydroelectric facilities.
- o payments to MWDSC and Kings River Conservation District for the output of specific hydroelectric facilities.
- o debt service, OM&R, and fuel costs associated with Reid Gardner Unit No. 4.

SWP energy sources and uses by field division are shown on Figures N and O, pages VI-2 and 3. Monthly summaries of Project energy sources and uses are presented in Section VI.

PROJECT STATUS IN 1983

Project Facilities

The SWP conserves water for distribution to much of California's population and to irrigated agriculture. It also provides flood control, water quality control, electrical power generation, new recreational opportunities, and enhancement of sport fisheries and wildlife habitat.

The first SWP facilities to become operational were Frenchman Dam and Lake in the Upper Feather River Division and the South Bay Aqueduct in the San Francisco Bay Area in 1962. By 1973, construction of the initial facilities of the SWP was complete. This provided for operation of the entire SWP from Plumas County in the north to Riverside County in the south. An additional facility, William E. Warne Powerplant, began generation on November 17, 1982.

SWP facilities in operation during 1983 included: 22 reservoirs with a gross capacity of 6,797,171 ac-ft; 6 power plants with a total output capacity of 1,631 megawatts;¹ 16 pumping plants housing 109 units with a total motor rating of 2,487 MW;² and 537 miles of aqueduct.

During 1983, water was delivered from SWP facilities to:

- o 22 State long-term water service contractors.
- o 2 State agencies receiving recreation water.
- o 3 Local agencies receiving water to satisfy prior water rights.
- o 4 Local agencies receiving other water.

¹ Includes 202 MW of federal power generation output at San Luis Pumping-Generating Plant, and excludes 1036 MW from Castaic Powerplant for LADWP.

² Includes 261 MW of federal pumping capacity at San Luis Pumping-Generating Plant and Dos Amigos Pumping Plant.

In addition, SWP facilities were used to wheel federal water to four USBR customers. 1983 deliveries are shown by receiving agency in table 3, page I-2.

Outages and Operating Limitations

Major outages and operating limitations of SWP facilities during 1983 follow:

- o The useable Silverwood Lake storage capacity was reduced to about 28,000 ac-ft from mid-September until mid-December while the outlet tunnel was bored for a future Mojave Siphon Powerplant.
- o Contracted-for transmission capacity was disrupted during a storm on September 21 when 34 towers of the PGandE backbone transmission system were downed and the lines broken north of the Midway Substation. Total transmission across Midway was limited to 600 megawatts (MW) north and 200 MW south. Southern California Edison Company's energy entitlement from Edward Hyatt and Thermalito powerplants was rerouted via the Gates Substation near Coalinga to Diablo Canyon Substation and then to Midway. On October 7, full line service was restored.
- o Storage at Pyramid Lake was lowered at the end of September to allow work expanding the on-shore recreational facilities. Full operational use of the reservoir was resumed by the end of November.
- o O'Neill Forebay was drawn down and operated between elevations 215-217 ft (about 31,000-35,600 ac-ft storage) in December to add riprap on the lower level of the upstream face of the Forebay Dam.

SACRAMENTO-SAN JOAQUIN DELTA OPERATIONS

SWP operations in the Sacramento-San Joaquin Delta are greatly influenced by the classification of year type as prescribed in the State Water Resources Control Board's Decision 1485. Earlier forecasts of the Sacramento Valley unimpaired runoff for the four river basins¹, as well as the May 1 forecast which is used to make the final determination of the water year type, classified the 1982-83 water year as a "wet year". Water quality conditions were excellent throughout 1983 and all D-1485 standards were easily met.

The Delta outflow index, including flows into the Yolo Bypass via the Fremont and Sacramento Weirs, averaged over 138,500 cfs from January through May 1983, reflecting the high winter and spring runoff. The index, with bypass flows included, peaked at over 300,000 cfs from March 3 through 6 and again from March 14 through 16. The lowest index flows occurred in August, averaging over 23,000 cfs during that period.

The State Water Resources Control Board and the California Department of Fish and Game requested that the outflow index average at least 10,000 cfs during July and August, when no outflow index standards are otherwise in effect, as a test to see if striped bass production would be increased. Since above-normal releases were made from major reservoirs of both the Sacramento and San Joaquin river systems, in order to dewater flood reservation space, the outflow index remained substantially above the requested rate in August.

¹ The four river basins are: Sacramento River above Bend Bridge, near Red Bluff; Feather River, total inflow to Lake Oroville; Yuba River at Smartville; and American River, total inflow to Folsom Lake.

It was not necessary for the USBR and DWR to declare "balanced water conditions"¹ during 1983, as the abundant water supply was more than adequate to meet Sacramento Valley in-basin use, including water quality objectives, plus exports. If "balanced water conditions" had been declared by the USBR and DWR, the determination for apportioning each agency's share of responsibility for reservoir releases would have been based on the draft "Supplemental Agreement Between the United States of America and the State of California for Coordinated Operation of the Central Valley Project and the State Water Project", dated May 13, 1971. Both agencies had agreed during calendar year 1983 to operate as if the draft coordinated agreement had been executed, except for agreed-upon specific modifications, by a letter agreement dated June 4, 1982.

Figure A-1, page 23, shows 1983 water quality data at three Delta stations, Emmaton, Jersey Point, and Contra Costa Canal Intake. Figure A-2, page 24, shows 1983 high-high tide at Antioch, the Delta outflow index, and Delta inflow. Since balanced water conditions did not occur in 1983, computations to determine federal and State shares of responsibility for meeting in-basin use and D-1485 water quality standards did not apply and, therefore, figures (Figures B-2 and B-3, in previous year's reports) showing the results of such computations are not included in this report.

¹ "Balanced water conditions" occur when it is agreed by USBR and DWR that the releases of water from upstream CVP and SWP reservoirs, plus other inflows, approximately equal the water supply needed to meet Sacramento Valley in-basin uses, including water quality objectives, plus exports.

Figure B, page 25, shows the total federal and State "lagged storage withdrawals" and exports. The term "lagged storage withdrawals" means that the storage withdrawals have been adjusted for the travel time , or "lag", (to the nearest whole day) for reservoir releases to reach the Delta; water data at the Delta will then be on the same time basis. For data comparison and calculations at the Delta, storage withdrawals from Whiskeytown and Shasta Lakes are time lagged by five days, those from Lake Oroville are lagged by two days, and those from Folsom Lake are not lagged.

Table 1, page 26, shows by months, the routing of water released to the Sacramento, Feather, and American Rivers from CVP-SWP upstream reservoirs. The water flowing to the ocean, represented by the Delta outflow index, provides a fresh water barrier to the more-saline water of Suisun Bay, and thus maintains specified levels of Delta water quality. During periods of balanced water conditions, any water in excess of that needed for in-basin use (including Delta consumptive use and the Delta outflow index) is available for export from the Delta in accordance with the terms of D-1485.

To protect the striped bass fishery and avoid pumping very small fish from the Delta, D-1485 limits exports from the Delta to 3,000 cfs average monthly flow for both the CVP and the SWP during May and June, plus a limit of 4,600 cfs average monthly flow for the SWP for July. During May, SWP Delta exports averaged about 140 cfs which increased to an average of about 750 and 1,150 cfs in June and July, respectively. Total exports for the year from the Delta by

SWP facilities were about 1.3 million ac-ft, which included 131,751 ac-ft of CVP water pumped for the USBR. For a more detailed explanation of federal pumping at Banks Pumping Plant, see page 35.

Operation of the SWP in 1983 reduced the mean Delta outflow index (i.e., Delta exports exceeded the augmentation of Delta inflows by upstream reservoir storage withdrawals) during the entire months of January, February, May, and June, and increased the index from July through October and in December. March, April, and November showed intermittent augmentations and reductions. Despite these reductions, the Delta outflow index remained well above the level required by D-1485 throughout the year. Table 2 on page 27 provides a tabulation of the daily computed Delta outflow index, reflecting flows in the Sacramento River at "I" Street Bridge and in the San Joaquin River at Vernalis, plus Yolo Bypass flows from Fremont Weir in January through April and in December, and from Sacramento Weir in February and April. Starting on July 1, 1982, the flow measurements in the Sacramento River were shifted from the "I" Street Bridge to a more accurate measurement at Freeport.

During 1983, the Old River barrier was not needed since flows at Stockton were greater than 500 cfs throughout the fall. In most years, when low San Joaquin River flows indicate the need, a temporary rock barrier is installed at the head of Old River to enhance the fall salmon spawning run in the San Joaquin River in areas upstream of Stockton. The barrier is placed to increase flows in the San Joaquin River and also to raise dissolved oxygen levels in the water. It is removed when river flows increase in early winter.

For further information and data on 1983 Delta operations, see DWR Bulletin 132-84, "The California State Water Project, Appendix E, Water Operations in the Sacramento-San Joaquin Delta During 1983".

**FIGURE A-1: WATER QUALITY CONDITIONS AT SELECTED DELTA STATIONS
1983**

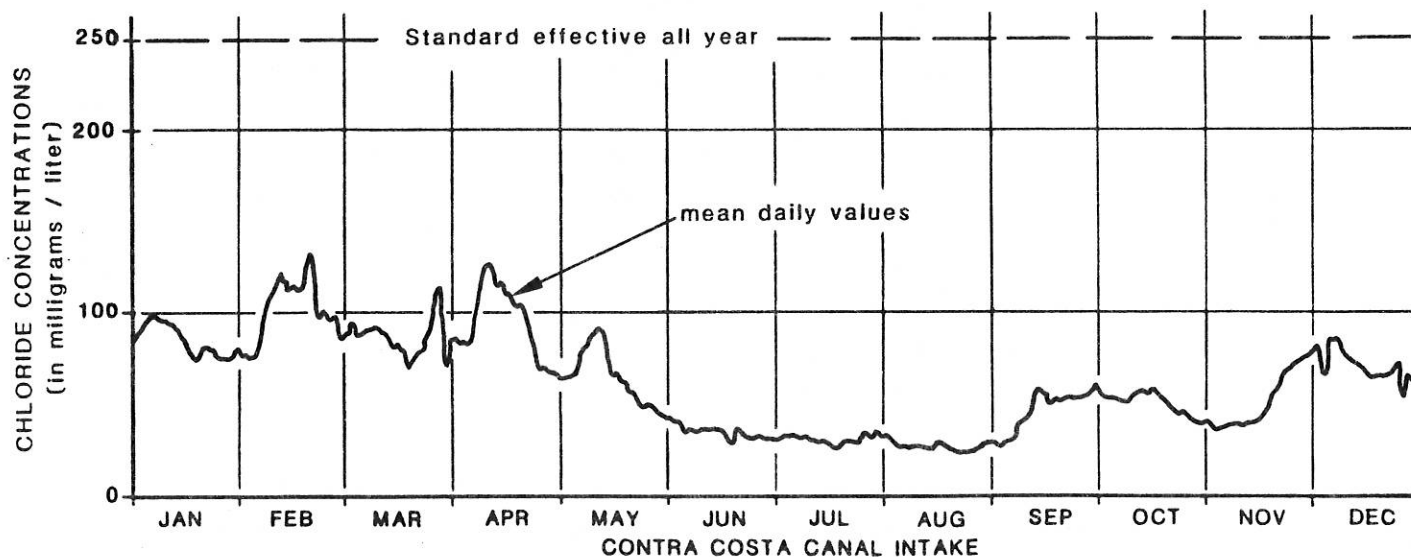
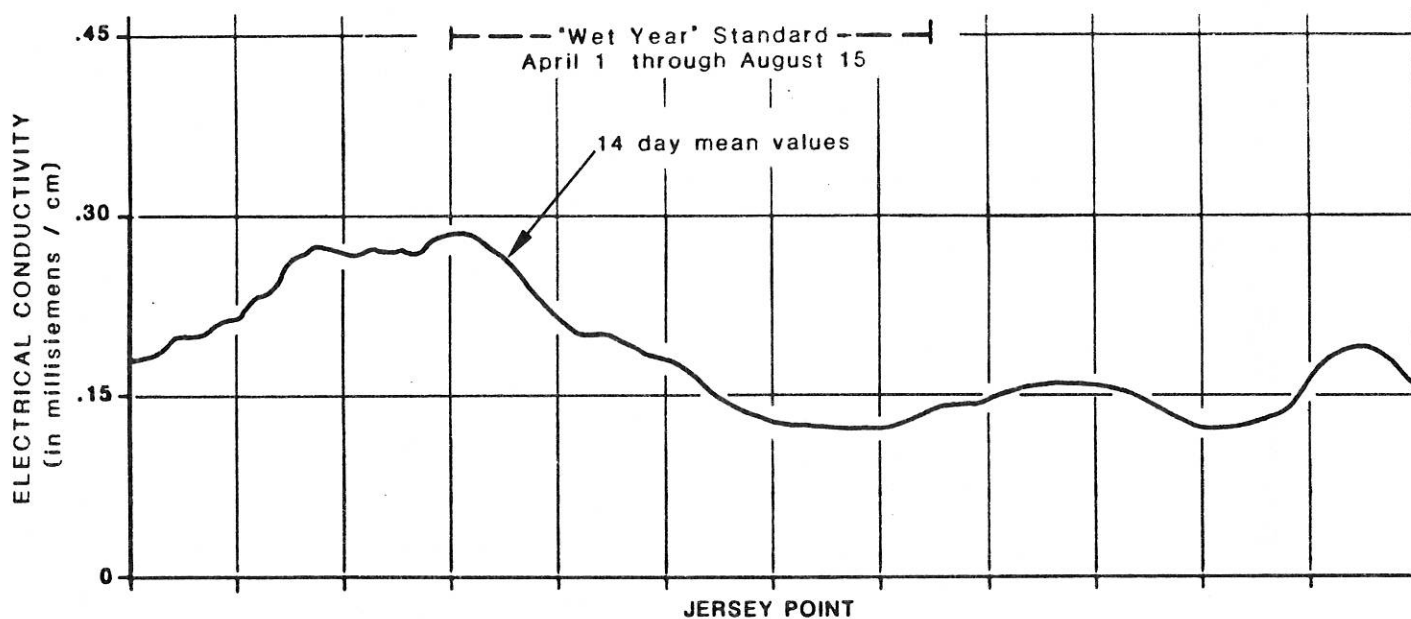
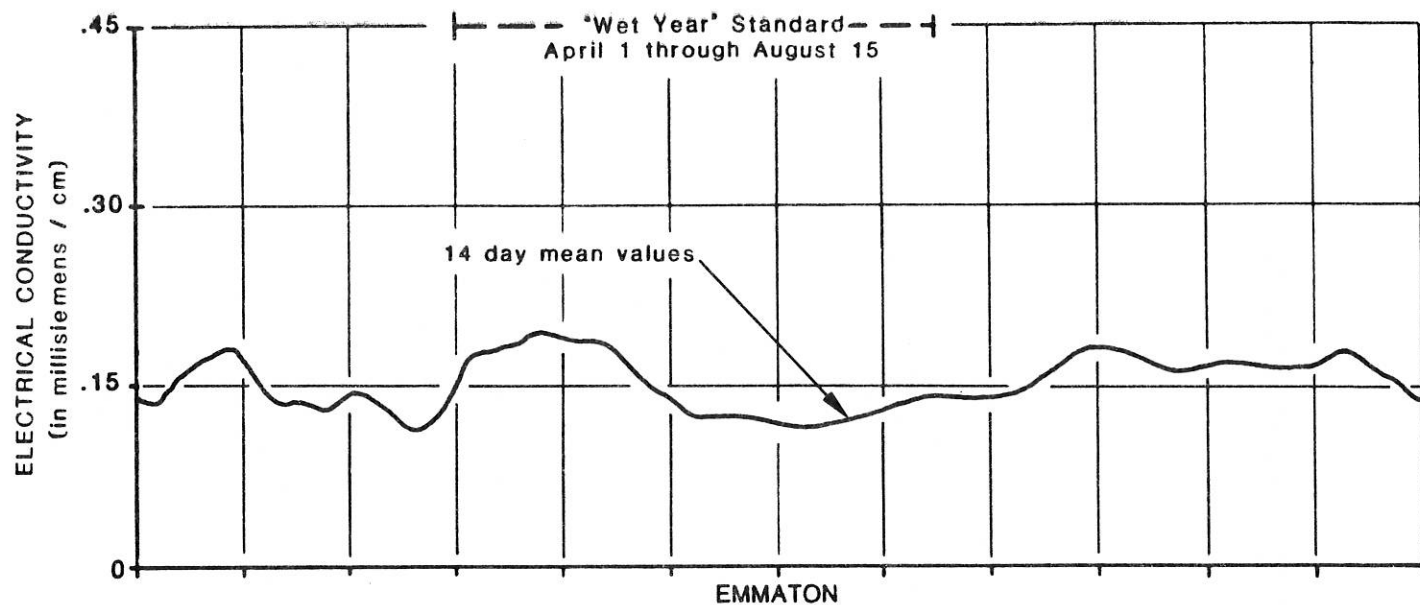


FIGURE A-2: DELTA TIDE, OUTFLOW INDEX, AND INFLOW
1983

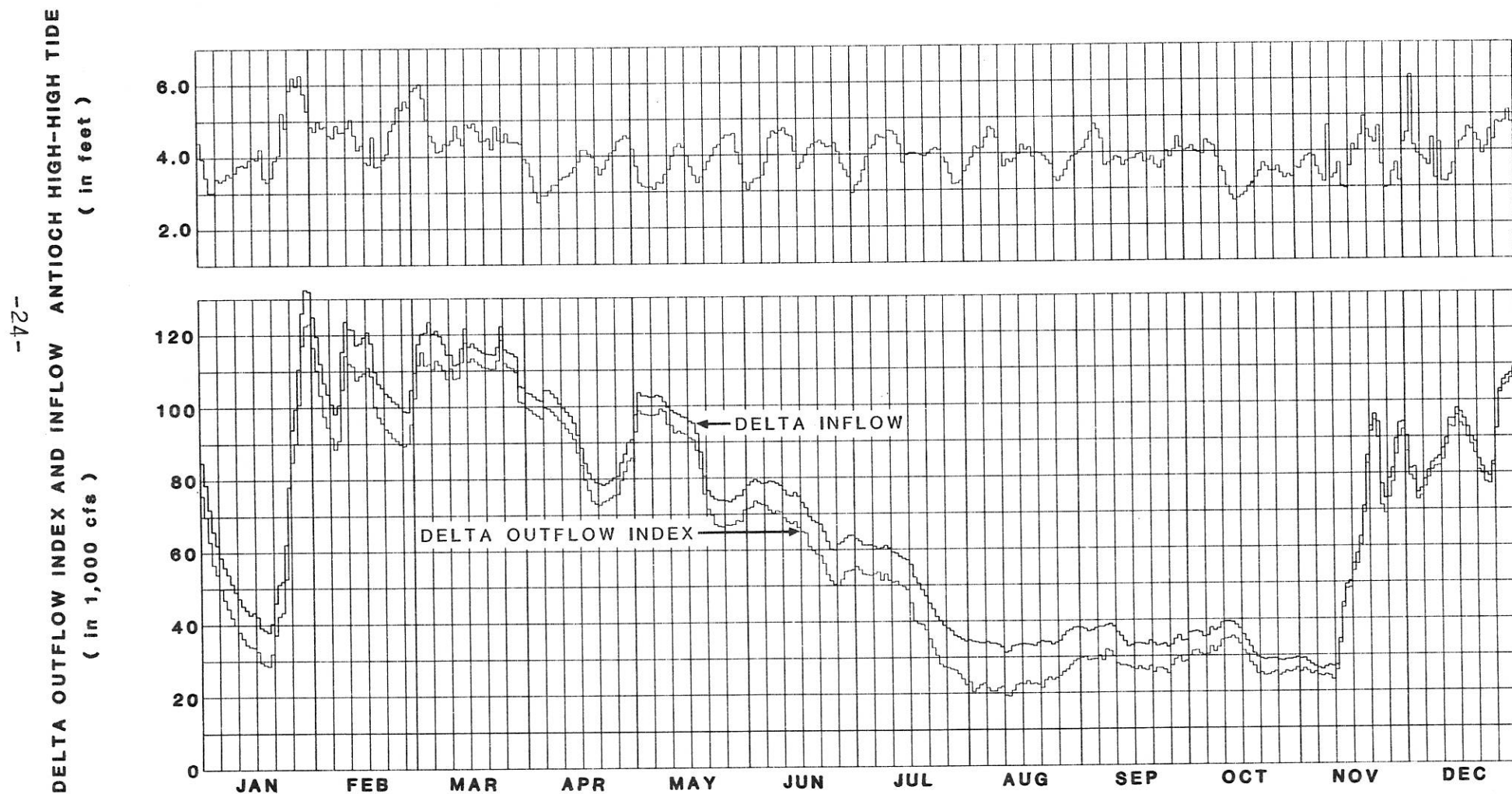
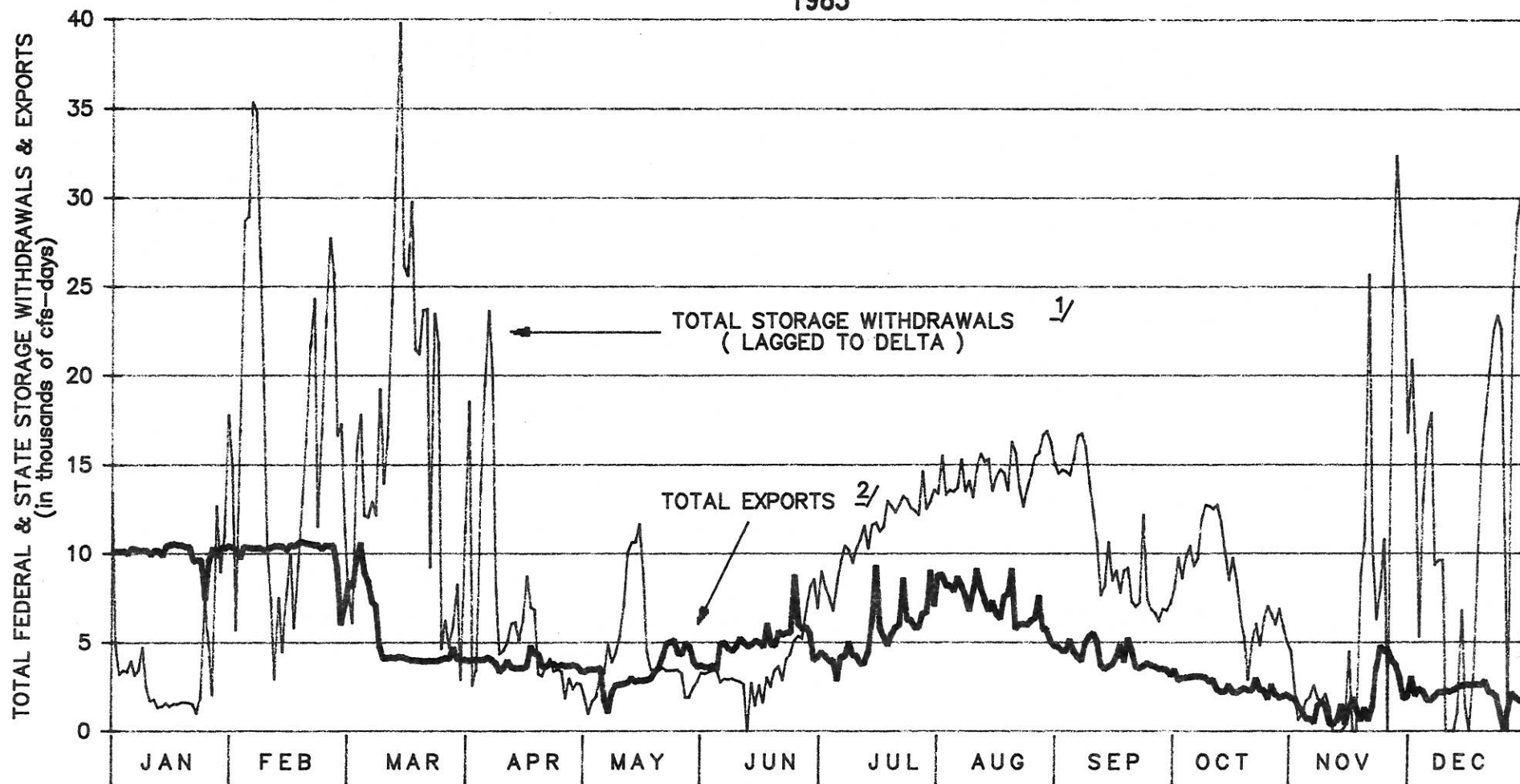


FIGURE B: CVP-SWP COORDINATED OPERATION
1983



1/ Includes Folsom, Whiskeytown-Shasta, and Oroville storage withdrawals.

2/ Includes total pumping from Banks, Tracy, and Contra Costa Plants plus Folsom South Canal.

TABLE 1: SACRAMENTO BASIN AND SACRAMENTO - SAN JOAQUIN DELTA OPERATIONS
1983

(in thousands of acre-feet except as noted)

MONTH	UPSTREAM RESERVOIR RELEASES TO RIVER			SACRAMENTO RIVER IN-BASIN USE <u>2/</u>	DELTA INFLOW			DELTA USES			DELTA EXPORTS		
	KESWICK <u>1/</u>	OROVILLE <u>1/</u>	NIMBUS		SACRAMENTO RIVER AT <u>3/</u> SACRAMENTO	SAN JOAQUIN RIVER AT <u>4/</u> VERNALIS	TOTAL <u>5/</u>	DELTA CONSUMPTIVE USE	DELTA OUTFLOW INDEX		TOTAL EXPORTS	EXPORTED BY STATE-DWR	EXPORTED BY FEDERAL-USBR
									TOTAL	AVERAGE CFS			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
JANUARY	476	662	483	2,442	2,927	1,185	4,074	-56	3,510	57,082	617	377	240
FEBRUARY	2,255	1,086	701	4,550	4,387	1,741	6,149	-37	5,617	101,137	572	348	224
MARCH	2,713	2,006	1,192	7,504	4,828	2,315	7,181	-10	6,857	111,521	334	83	251
APRIL	1,230	939	563	1,795	3,599	1,884	5,500	63	5,210	87,659	229	7	222
MAY	926	830	745	1,475	3,829	1,688	5,559	121	5,230	85,051	209	8	201
JUNE	870	597	576	876	2,879	1,374	4,286	191	3,797	63,803	295	44	251
JULY	860	443	423	222	1,906	1,216	3,165	268	2,577	41,911	325	70	255
AUGUST	862	369	261	53	1,538	575	2,121	252	1,428	23,215	441	115	326
SEPTEMBER	613	770	220	276	1,464	635	2,115	174	1,691	28,414	248	40	208
OCTOBER	638	230	168	296	1,302	756	2,086	118	1,814	29,472	154	21	133
NOVEMBER	737	505	682	1,237	2,906	564	3,360	55	3,200	53,784	106	45	61
DECEMBER	1,589	1,263	878	3,955	4,595	937	5,536	2	5,402	87,860	128	26	102
TOTAL	13,769	9,700	6,892	24,681	36,160	14,870	51,132	1,141	46,333	---	3,658	1,184	2,474

^{1/} Time lagged values (Keswick: 5 days; Oroville: 2 days).

^{2/} Positive values show accretions; negative values show depletions.

^{3/} Values are a measured daily average of Sacramento River at Freeport.

^{4/} Column 6 is based on daily 6 a.m. readings. Columns 1, 2, 3, 12 and 13 are based on measured total daily flow.

^{5/} Includes Sacramento County Regional Waste Water Treatment Plant.

TABLE 2: DELTA OUTFLOW INDEX WITH BYPASS

1983

(in cfs-days except as noted)

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	76,284	222,994	198,671	165,737	99,415	72,074	55,850	23,208	29,995	30,265	25,579	92,413
2	70,272	206,606	257,269	165,315	109,782	72,507	54,980	20,674	30,088	31,658	26,478	79,849
3	63,542	189,131	342,146	164,364	107,484	74,130	53,532	21,509	29,391	31,759	25,945	78,644
4	57,058	167,135	373,563	163,572	107,192	73,558	53,299	22,414	29,639	30,793	25,124	73,196
5	54,201	158,635	373,161	152,383	105,607	73,099	53,201	22,846	29,831	30,515	25,283	74,388
6	50,171	138,373	323,760	149,909	99,789	73,034	53,731	21,714	30,628	30,760	24,463	80,379
7	47,358	125,913	293,401	140,074	100,179	71,778	54,121	20,858	29,167	32,883	24,393	83,724
8	44,904	148,952	274,335	123,488	101,550	70,959	51,762	20,904	32,069	31,333	24,822	87,399
9	42,399	207,335	258,647	112,758	100,320	71,407	53,634	21,670	31,815	32,796	24,449	88,351
10	40,275	210,550	242,958	106,021	96,842	71,087	51,801	21,996	30,342	34,522	23,298	92,798
11	38,373	203,251	240,788	99,856	96,363	69,518	51,192	19,703	28,157	34,965	25,999	110,402
12	36,518	192,053	227,506	95,685	94,244	68,190	51,298	19,227	27,735	35,054	33,463	162,389
13	34,924	203,936	237,497	93,415	94,886	67,884	50,408	20,930	27,722	35,465	43,322	183,751
14	34,094	215,107	304,359	91,675	93,977	68,425	50,032	22,552	27,588	34,916	48,590	160,325
15	34,042	215,765	320,120	87,975	93,790	66,678	49,065	22,769	26,949	33,296	48,812	154,114
16	32,928	207,304	302,817	84,426	92,600	65,619	45,280	22,736	26,682	31,598	53,581	138,554
17	29,939	203,267	290,838	80,335	91,284	65,182	40,572	23,525	27,436	30,577	55,227	129,988
18	29,126	183,410	278,211	77,536	88,324	61,365	39,663	22,786	26,652	28,120	60,794	120,773
19	28,865	174,686	250,477	74,511	83,249	60,239	39,465	22,857	26,155	27,319	70,641	112,530
20	32,330	167,242	227,635	73,732	76,296	59,132	37,976	22,560	27,177	25,201	90,491	105,211
21	37,286	159,698	209,683	73,526	71,944	58,888	35,381	21,651	25,790	25,287	103,831	95,720
22	42,768	158,630	196,698	74,189	70,189	56,655	32,938	23,605	26,735	24,804	109,087	92,235
23	43,842	151,082	197,122	74,502	67,818	53,436	30,920	24,586	26,711	24,919	98,443	88,352
24	52,987	144,527	205,464	75,278	67,298	51,678	28,325	23,877	27,158	25,220	71,647	88,095
25	72,623	136,518	216,352	76,054	67,088	50,975	27,666	24,375	26,332	25,837	76,710	112,782
26	115,548	136,052	209,450	76,375	67,460	50,630	27,441	24,949	27,480	24,690	107,737	175,512
27	154,165	142,537	196,952	80,173	67,384	52,103	27,054	26,050	29,307	25,100	115,581	260,069
28	197,051	170,331	191,264	82,722	67,702	54,382	26,556	26,698	30,134	25,790	119,626	308,634
29	244,033		190,469	85,843	68,837	54,676	25,350	27,989	28,700	25,647	102,781	308,399
30	266,088		174,376	86,500	68,692	54,794	24,225	28,940	28,873	26,001	99,230	273,803
31	255,402		161,589		71,701		22,523	29,513		26,558		241,389
TOTAL	2,359,396	4,941,020	7,767,578	3,087,929	2,689,286	1,914,082	1,299,241	719,671	852,438	913,648	1,785,427	4,254,168
AVE	76,110	176,465	250,567	102,931	86,751	63,803	41,911	23,215	28,415	29,473	59,514	137,231
MAX	266,088	222,994	373,563	165,737	109,782	74,130	55,850	29,513	32,069	35,465	119,626	308,634
MIN	28,865	125,913	161,589	73,526	67,088	50,630	22,523	19,227	25,790	24,690	23,298	73,196
TOTAL IN AF	4,679,862	9,800,513	15,406,991	6,124,907	5,334,199	3,796,582	2,577,045	1,427,467	1,690,811	1,812,221	3,541,394	8,438,142

Average for year = 89,271 cfs-days
 Maximum for year = 373,563 cfs-days
 Minimum for year = 19,227 cfs-days

Annual total: 32,583,884 cfs-days
 64,630,134 acre-feet

PROJECT OPERATIONS

"Wet" year conditions in 1983 reduced demands for SWP water substantially and resulted in lower Project water delivery requests by water contractors as compared to 1982. SWP water delivered in 1983 totaled 1,271,721 ac-ft, a 37 percent decrease from Project water delivered in 1982. In addition, local water delivered from SWP facilities totaled 32,826 ac-ft, up 20 percent from the amount delivered in 1982.

1983 Deliveries

<u>Field Division</u>	<u>Amount (in ac-ft)</u>	<u>Percent Change from 1982 Deliveries</u>
Oroville	11,119	-7
Delta	120,904	-6
San Luis	426	-36
San Joaquin	674,317	-37
Southern	<u>497,781</u>	<u>-40</u>
Total	1,304,547	-37

A tabulation of 1983 water deliveries by type follows:

<u>Type</u>	<u>Amount (in ac-ft)</u>
Entitlement Water	1,184,119
Surplus Water	13,019
Wet Weather Water	750
Kern River Intertie Water	62,820
Mitigation Water	381
1977 Emergency Relief Water	605
Repayment Water	6,071
Ground Water Demonstration Water	681
Recreation Water	<u>3,275</u>
Subtotal	1,271,721
Local Supply Water (non-Project water)	<u>32,826</u>
Total	1,304,547

Table 3 on page I-2 presents water deliveries by year for individual agencies.

Water deliveries to federal customers from the USBR share of the joint-use facilities totaled 1,269,542 ac-ft. This amount is up half of one percent from the 1982 delivery amount. CVP water wheeled by the State for the USBR in 1983 totaled 364 ac-ft. See page 35 for more details.

Oroville Field Division

Upper Feather River Reservoirs

All three of the upper Feather River reservoirs filled and spilled in 1983. Antelope Lake spilled on three occasions in 1983: from January 28 through July 10, July 15 through 24, and from November 24 through December 31. Frenchman Lake spilled from March 13 through July 10 and December 24 through December 31, while Lake Davis spilled only from June 10 through 18. Antelope Lake has spilled every year since its original filling in 1965 with the exception of 1977. The following table shows the 1983 range of storages of the three upper Feather River reservoirs:

Upper Feather River Reservoir Storage

<u>Reservoir</u>	<u>Maximum (in ac-ft)</u>	<u>Date</u>	<u>% of Capacity</u>	<u>Minimum (in ac-ft)</u>	<u>Date</u>	<u>% of Capacity</u>
Antelope Lake	25,153	5/29&30	112	20,409	10/22	90
Frenchman Lake	59,319	5/26-28	107	47,324	10/22	85
Lake Davis	84,894	6/12	101	67,757	4/18	80

Monthly operation tables for the upper Feather River reservoirs are on page V-1.

Lake Oroville

Detailed information on Lake Oroville operation can be found in Section V, on pages V-2 through V-6, including maintaining downstream water temperature standards by adjusting intake structure draft elevations as shown in figure G, page V-5. A summary of Lake Oroville 1983 operations extremes is given in the following table:

Lake Oroville Operations Extremes

<u>Parameter</u>	<u>Amount</u>	<u>Date</u>
Storage		
Maximum	3,512,983 ac-ft	June 19
Minimum	2,728,149 ac-ft	Nov. 4
Daily Inflow		
Maximum	183,596 ac-ft	Mar. 13
Oroville Complex Total		
Release to Feather River		
Maximum Daily	119,010 ac-ft	Mar. 14

The computed inflow to Lake Oroville during 1983 was 9,812,282 ac-ft. Included in that amount are releases from Ponderosa Dam (490,800 ac-ft) and Lake Wilenor (3,712 ac-ft).

Water Deliveries

Deliveries during 1983 are shown in the following table. Other Project deliveries in the Oroville Field Division are shown on page I-2.

Agency:

SWP Contractors:

County of Butte	325
Plumas County	262

Local Supply (under special contracts):

Last Chance Water District	9,073
Thermalito Irrigation District	1,459

Prior Water Rights Entitlement:

Upper Feather Lakes	797
Palermo Canal	6,761

Thermalito Afterbay Deliveries:

Sutter-Butte Canal	372,322
PGandE Lateral	2,643
Richvale Canal	62,552
Western Canal	<u>156,892</u>

Total	613,086
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Figure C, page 34, presents a graph of the 1983 inflow to, releases from, and diversions from within the Oroville-Thermalito complex. The inflow used for the graph is the computed inflow to Lake Oroville.

Hyatt-Thermalito Powerplants

Gross generation at the Hyatt-Thermalito power complex during the year totaled over 4,903,000 MWh. Energy consumed for pumpback requirements (due to extremely wet conditions) and station service totaled nearly 15,000 MWh. A graph showing the Edward Hyatt and Thermalito Powerplants' monthly gross generation is presented on page VI-4. Tables of monthly power operations are tabulated in section VI.

Activities, Outages, and Limitations

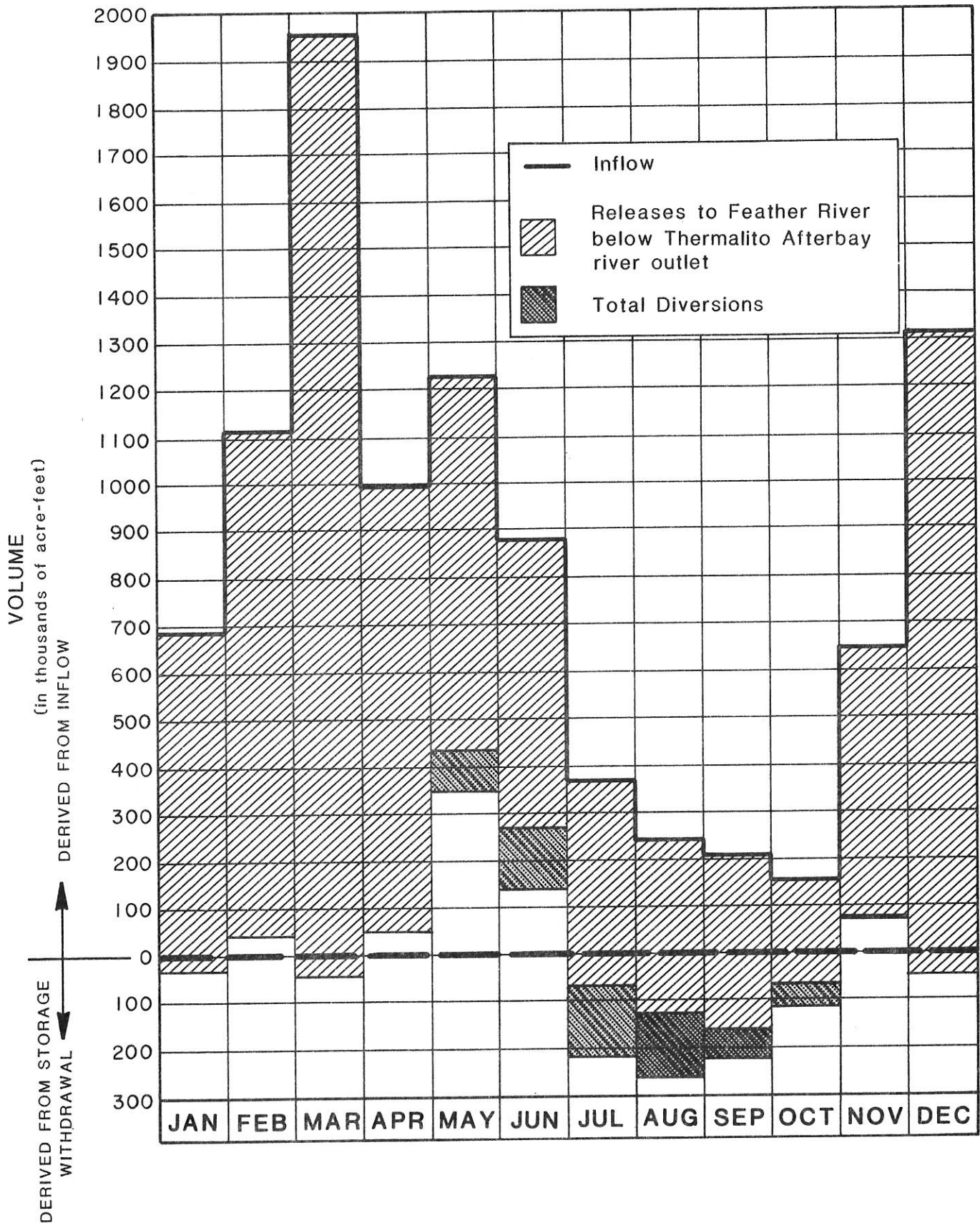
Other activities, outages, and limitations affecting or influencing operations of the Oroville Field Division in 1983 were:

- o The No. 1 intake gate at Edward Hyatt Powerplant was out of service from August 29 through September 1 for annual maintenance. The No. 2 intake gate was also out of service April 22-26 to clean the return oil filters and to proof test the gate crane, and again August 10-18 for maintenance.
- o Several intake shutters were removed August 31 at Lake Oroville to lower the downstream water temperature in the Feather River to 55 degrees Fahrenheit for the fall salmon run.

The following units at the two power plants in the Oroville Field Division were out of service for the times and reasons noted.

<u>Unit</u>	<u>Outage Beginning</u>	<u>Outage Ending</u>	<u>Reason</u>
<u>Edward Hyatt Powerplant</u>			
1	4/18/83	4/19/83	Inspect and clean thrust bearing oil tub.
	10/17/83	10/29/83	Annual maintenance and replace transformer.
2	10/24/83	11/7/83	Annual maintenance and install cooling water equipment.
4	2/12/83	2/14/83	Separated from system to test the voltage loop on Unit No. 3 stator iron.
5	9/20/83	10/11/83	Annual maintenance
6	11/7/83	11/21/83	Annual maintenance and replace neutral ground transformer.
<u>Thermalito Powerplant</u>			
1	12/13/83	12/28/83	Annual maintenance.
2	11/28/83	12/12/83	Annual maintenance and repair air depressing valve.
3	2/2/83	2/23/83	Annual maintenance.
	12/14/83	12/29/83	Maintenance.
4	10/7/83	10/15/83	Annual maintenance and replace one slip ring.

**FIGURE C: OROVILLE - THERMALITO COMPLEX OPERATIONS
1983
INFLOW, RELEASES & DIVERSIONS**



Delta Field Division

Water Deliveries

Comparisons of the 1983 water deliveries to the three areas the Division serves and their percent differences from 1982 deliveries are shown in the following table. Annual water deliveries to each contractor are presented on page I-2.

Delta Field Division Water Deliveries

<u>Area</u>	<u>Water Deliveries (in ac-ft)</u>	<u>Difference from 1982 (in percent)</u>
California Aqueduct	3,822	-21
North Bay Aqueduct	2,287	89
South Bay Aqueduct	94,656	-12

In addition to the SWP deliveries, a total of 364 ac-ft of federal CVP water was wheeled through the California Aqueduct to Tracy Golf and Country Club, and 132 ac-ft of Lake Del Valle recreation water was delivered through the South Bay Aqueduct.

Harvey O. Banks Delta Pumping Plant

Pumping at the Banks Pumping Plant for the year totaled 1,316,448 ac-ft, 50 percent less than that pumped during 1982.

Of the 1983 total pumping at the Banks Pumping Plant, 131,751 ac-ft was pumped for the USBR and was conveyed through the California Aqueduct to O'Neill Forebay. Pumping for the USBR at Banks Pumping Plant consisted of 78,767 ac-ft of D-1485 replacement water, 52,484 ac-ft of MWD exchange water, and 500 ac-ft of water for Tracy Golf and Country Club.¹

¹ Amounts of water pumped at Banks Pumping Plant for federal contractors may not reflect amounts wheeled for the same time frame, since wheeling and pumping do not necessarily take place concurrently.

In complying with D-1485 limitations on Delta diversions, described on page 20, the USBR foregoes up to 193,590 ac-ft of its May-June diversion capacity at its Tracy Pumping Plant. This foregone capacity is then replaced by pumping CVP water at Banks Pumping Plant to the extent needed. In 1983, 78,767 ac-ft of D-1485 replacement water was pumped at Banks Pumping Plant during the months of May and June to replace water foregone in 1982 which could not be pumped that year because of San Luis Reservoir limitations.

South Bay Aqueduct

Pumping at the South Bay Pumping Plant totaled 67,489 ac-ft for the year, about 78 percent of the amount pumped in 1982.

Maximum storage in Lake Del Valle was 51,087 ac-ft, about 66 percent of absolute maximum storage capacity on March 3. Storage above 39,000 ac-ft is flood reservation between November 1 and March 31, and above 40,000 ac-ft is flood reservation between April 1 and October 31. Minimum storage was 26,333 ac-ft, on November 20.

A monthly reservoir operation table for Lake Del Valle is shown on Table 11, page V-8.

Activities, Outages, and Limitations

Other activities, outages, and limitations affecting or influencing operations of the Delta Field Division in 1983 were:

- o The No. 1 discharge line at the Harvey O. Banks Delta Pumping Plant was out of service from December 5 through the end of the year to replace the "O" rings on Unit No. 1 discharge valve upstream and downstream seats. The No. 2

discharge line was out of service from April 14 to May 13 for inspection, recoating unit pump extension, and repairing No. 4 and 5 discharge bypass valves. Also, the No. 3 discharge line was out of service from July 7 through August 10 to remove the No. 7 discharge valve and replace downstream "O" rings.

The following units at the four pumping plants in the Delta Field Division were out of service for the times and reasons noted. If no date is given in the "Outage Ending" column, the unit remained out of service at the end of 1983.

<u>Unit</u>	<u>Outage Beginning</u>	<u>Outage Ending</u>	<u>Reason</u>
<u>South Bay Pumping Plant</u>			
4	10/3/83	---	Replace impeller.
5	2/25/83	2/28/83	Annual maintenance.
	3/7/83	4/4/83	Take pressure readings and repair the discharge valve seats.
6	3/14/83	3/28/83	Take motor readings.
8	2/15/83	3/9/83	Recoat pump and install anodes.
<u>Harvey O. Banks Delta Pumping Plant</u>			
1	11/14/83	11/25/83	Annual maintenance.
2	11/21/83	12/2/83	Annual maintenance.
3	7/18/83	7/27/83	Annual maintenance.
4	4/14/83	5/11/83	Disassemble and install new impeller.

<u>Unit</u>	<u>Outage Beginning</u>	<u>Outage Ending</u>	<u>Reason</u>
<u>Harvey O. Banks Delta Pumping Plant (continued)</u>			
5	4/5/83	4/11/83	Vibration and balance testing.
	4/11/83	6/24/83	Annual maintenance.
6	8/24/83	9/2/83	Annual inspection.
7	6/15/83	6/30/83	Meter and relay calibration.
	7/26/83	8/23/83	Annual maintenance.

San Luis Field Division

Water Deliveries

1269901 Federal CVP water deliveries during the year totaled
1,270,265 ac-ft, four percent less than the 1982 total. The
following tabulation details the components of these deliveries.

Delivered from Joint use facilities	1,269,542 ac-ft
Wheeled for USBR to Tracy Golf and Country Club	364 ac-ft
Delivered from San Luis Reservoir and O'Neill Forebay to Department of Parks and Recreation	37 ac-ft
Delivered from O'Neill Forebay to Department of Fish and Game	162 ac-ft
Delivered to the Mendota Waterfowl Habitat area	160 ac-ft

In addition, 426 ac-ft of State water was delivered to
the Departments of Fish and Game and Parks and Recreation.

Mitigation Water

The SWP's share of mitigation water for 1983 totaled
3,782 ac-ft. This water was conveyed to the California Department
of Fish and Game, Grasslands Water District, and Los Banos Gravel
Company through the Delta-Mendota Canal, Mendota Pool, and O'Neill
Forebay. In addition, the SWP share of wildlife habitat water for
1983 was 184 ac-ft. In 1983, the SWP paid back the USBR for 1982
mitigation water by delivering 3,678 ac-ft of water to the Bureau
in O'Neill Forebay. The SWP pays back the USBR 55 percent of
mitigation water the year after that water is delivered.

San Luis Reservoir

San Luis Reservoir storage reached its maximum of the year, 2,024,152 ac-ft, on June 5. Maximum operating storage capacity is 2,027,835 ac-ft. The minimum storage for the year, 477,093 ac-ft, was reached on January 1. The minimum storage in 1983 fell below its normal range because of the San Luis Dam embankment slide of 1981. A graph showing the storage of San Luis Reservoir for 1983 is presented on page V-11.

The 1983 total pumping at San Luis Pumping-Generating Plant was 2,001,134 ac-ft, which increased by 33 percent over the amount pumped in 1982. Total water released from San Luis Reservoir to O'Neill Forebay for generation was 508,658 ac-ft, about 53 percent of the amount in 1982. These large changes in pumping and generation were attributable to the San Luis Dam embankment slide. Monthly operation tables for San Luis Reservoir and O'Neill Forebay are presented in Section V.

San Luis Dam Slide

The contracts for repair of the September 1981 dam embankment slide were completed in January of 1983. Abundant winter and spring runoff, reduced SWP delivery demands, and the availability of low-cost energy for pumping allowed San Luis Reservoir to be refilled by early May. Over 1,500,000 ac-ft of water were added to storage in the reservoir during the first five months of 1983.

Activities, Outages, and Limitations

The following units at the two pumping plants in the San Luis Field Division were out of service for the times and reasons noted.

If no date is given in the "Outage Ending" column, the unit remained out of service at the end of 1983.

<u>Unit</u>	<u>Outage Beginning</u>	<u>Outage Ending</u>	<u>Reason</u>
<u>San Luis Pumping-Generating Plant</u>			
1	3/11/83	9/6/83	Repair broken wear ring.
3	6/10/83	6/14/83	Repack pump.
5	6/7/83	6/22/83	Repack pump.
	7/7/83	---	Modify the 150 RPM stator and rotor to 156.5 RPM.
7	5/16/83	5/24/83	Repair amortisseur winding straps.
8	4/15/83	4/18/83	Field breaker failed.
<u>Dos Amigos Pumping Plant</u>			
1	6/21/83	6/24/83	Inspect discharge line and replace surge capacitors.
	7/15/83	8/5/83	Repair discharge line.
2	2/16/83	3/18/83	Annual maintenance.
3	2/1/83	2/16/83	Repair leak in discharge line.
	3/21/83	6/17/83	Repair discharge line leak.
5	5/4/83	5/6/83	Clean stator winding.
6	9/13/83	12/16/83	Annual maintenance and install new RTD.

San Joaquin Field Division

Water Deliveries

Of the 674,317 ac-ft total SWP water delivered to State water service contractors in the San Joaquin Field Division during 1983, about 97 percent was entitlement water, two percent was surplus water, and one percent was divided between wet weather, emergency relief, and repayment water. The largest delivery (595,112 ac-ft) was to the Kern County Water Agency. This represented 88 percent of the total SWP water delivered within the Division.

Preconsolidation repayment water delivered in 1983 to Shell California Production, Inc. (formerly Belridge Oil Company) totaled 6,071 ac-ft. At the end of 1983, the preconsolidation repayment account to be delivered before 1985 was as follows:

Preconsolidation Repayment Water (in ac-ft)

<u>Contract Holder</u>	<u>Total Contract Amount</u>	<u>1982 Balance</u>	<u>1983 Deliveries</u>	<u>Remaining Balance</u>
J. G. Boswell Co.	131,600	44,895	0	44,895
Shell California Production, Inc.	108,000	37,684	6,071	31,613

Table 3 on page I-2 shows water deliveries by year with totals to date for individual agencies.

Activities, Outages, and Limitations

Other activities, outages, and limitations affecting or influencing operations of the San Joaquin Field Division in 1983 were:

- o At Ira J. Chrisman Wind Gap Pumping Plant, the No. 1 discharge line was out of service from August 9 through September 15 to repair a leak in the line.
- o A. D. Edmonston Pumping Plant east discharge line was out of service from September 26 through the end of the year to install Unit 3 discharge valve and remove Unit 13 discharge valve. The west discharge line was out of service from April 12 through June 6 to couple unit 10 pump to the discharge valve. The No. 1 230 kV tap line was out of service from June 2 through July 1 to install an isophase bus.
- o A. D. Edmonston Pumping Plant Unit No. 3 was out of service for all of 1983 to replace the lower wear ring and repair the discharge valve downstream seat. Unit No. 13 was also out of service for all of 1983 for a complete unit overhaul.

The following units at the six pumping plants in the San Joaquin Field Division were out of service for the times and reasons noted. If no date is given in the "Outage Ending" column, the unit remained out of service at the end of 1983.

<u>Unit</u>	<u>Outage Beginning</u>	<u>Outage Ending</u>	<u>Reason</u>
<u>Coastal Branch</u>			
<u>Las Perillas Pumping Plant</u>			
1	10/3/83	11/14/83	Annual maintenance.
3	12/14/83	12/30/83	Annual maintenance.
<u>Badger Hill Pumping Plant</u>			
1	10/11/83	10/25/83	Annual maintenance.

<u>Unit</u>	<u>Outage Beginning</u>	<u>Outage Ending</u>	<u>Reason</u>
<u>Badger Hill Pumping Plant (continued)</u>			
2	12/5/83	---	Pump overhaul.
3	11/3/83	11/17/83	Annual maintenance.
4	1/17/83	1/28/83	Annual maintenance.
<u>California Aqueduct</u>			
<u>Buena Vista Pumping Plant</u>			
4	6/1/83	7/20/83	Install new backfill valve.
5	6/21/83	7/8/83	Install new backfill valve.
6	6/30/83	7/15/83	Install new backfill valve.
7	7/11/83	12/16/83	Annual maintenance and impeller repair.
<u>Wheeler Ridge Pumping Plant</u>			
1	1/17/83	1/21/83	Repair air compressor heads.
	2/15/83	2/18/83	Repack pump.
2	2/28/83	3/7/83	Repack pump and install guide bearings.
4	11/10/83	11/13/83	Modify backfill system.
5	5/12/83	5/27/83	Modify backfill system.
6	3/30/83	6/30/83	Annual maintenance.
	8/29/83	9/8/83	Modify backfill valve.
<u>Ira J. Chrisman Wind Gap Pumping Plant</u>			
1	8/9/83	9/15/83	Repair air leak.
2	8/12/83	9/15/83	Inspect impeller and discharge valve.
3	5/2/83	5/12/83	Replace bypass line and check valve.

<u>Unit</u>	<u>Outage Beginning</u>	<u>Outage Ending</u>	<u>Reason</u>
<u>Ira J. Chrisman Pumping Plant (continued)</u>			
4	2/9/83	11/16/83	Repair of field coils.
7	3/3/83	3/15/83	Replace backfill line.
<u>A. D. Edmonston Pumping Plant</u>			
1	11/16/83	11/23/83	Breaker annual maintenance.
2	6/30/83	7/5/83	Repair drag on the 213 motor switch.
	8/30/83	9/7/83	Breaker annual maintenance.
4	9/19/83	9/23/83	Breaker annual maintenance.
5	6/24/83	6/27/83	Repair unit excitor.
	11/28/83	12/6/83	Breaker annual maintenance.
6	9/12/83	9/16/83	Breaker annual maintenance.
7	12/8/83	—	To remove discharge valve and install bumped head.
9	5/29/83	6/2/83	Lower guide bearing leak.
11	8/29/83	9/1/83	To test the voltage regulator.
	12/5/83	12/12/83	Breaker annual maintenance.

Southern Field Division

Water Deliveries

Water deliveries from the SWP to State water service contractors in the Southern Field Division totaled 494,683 ac-ft, a 40 percent decrease from the amount delivered in 1982. Not included in this total is SWP recreation water (3,098 ac-ft).

As part of the continuation of a ground water demonstration program started in 1978 in Southern California, 681 ac-ft was added to the basin in January 1983, bringing the total storage of ground water in the demonstration program as of December 31, 1983 to 18,749 ac-ft, which will remain as supplemental SWP yield in the event of a future shortage.

Recreation water was delivered in 1983 to the California Department of Parks and Recreation at Silverwood Lake (102 ac-ft) and at Lake Perris (1,078 ac-ft) recreation areas, and to Los Angeles County Recreation Department at Castaic Lake (1,912 ac-ft), and to Pyramid Lake (6 ac-ft) recreation areas.

A table showing water deliveries by year with totals to date for individual agencies is presented on page I-2.

Reservoir Storage

At the start of the year, total combined reservoir storage in the Southern Field Division's five reservoirs (Pyramid Lake, Elderberry Forebay, Castaic Lake, Silverwood Lake, and Lake Perris) was 687,839 ac-ft, or 96 percent of the combined capacity. Combined storage at the end of the year was 616,330 ac-ft, or 86 percent of the combined capacity (717,251 ac-ft). In addition, 228,262 ac-ft of

natural flow was released through the Project's southern reservoirs. This was over five times the amount released in 1982.

A table of reservoir storages for the Southern Field Division reservoirs follows. Summaries of operations for those reservoirs are in Section V.

Reservoir Storages
(in ac-ft)

Reservoir (Normal max. operating storage)	<u>Start of 1983</u>	<u>End of 1983</u>	<u>Date</u>	<u>Maximum</u>	<u>Date</u>	<u>Minimum</u>
Pyramid Lake (169,901)	158,541	153,425	4/17	167,178	10/7	131,904
Elderberry Forebay (28,230)	26,691	29,909	10/28	34,535	7/4	21,693
Castaic Lake (319,247)	313,162	270,730	3/1	325,266	9/19	266,459
Silverwood Lake (73,032)	68,893	37,117	3/31	74,853	10/17	27,312
Lake Perris (126,841)	120,552	125,149	3/18	126,933	8/18	107,928

Activities, Outages, and Limitations

The following units in the Southern Field Division were out of service for the times and reasons noted. If no date is given in the "Outage Ending" column, the unit remained out of service at the end of 1983.

<u>Unit</u>	<u>Outage Beginning</u>	<u>Outage Ending</u>	<u>Reason</u>
<u>West Branch</u>			
<u>Oso Pumping Plant</u>			
2	3/7/83	5/5/83	Annual maintenance.
3	7/8/83	---	Repair discharge line valve.
5	7/8/83	---	Repair discharge line valve.
7	9/20/83	9/30/83	Annual maintenance.
8	8/23/83	9/2/83	Replace and repair pump bearings.
<u>East Branch</u>			
<u>Pearblossom Pumping Plant</u>			
4	1/3/83	3/1/83	Repair impeller.
	11/7/83	12/24/83	Annual maintenance.
5	1/31/83	5/1/83	Repair impeller.
6	6/13/83	10/31/83	Maintenance.
<u>Devil Canyon Powerplant</u>			
1	11/1/83	---	Annual maintenance.

PROJECT WATER

DELIVERIES

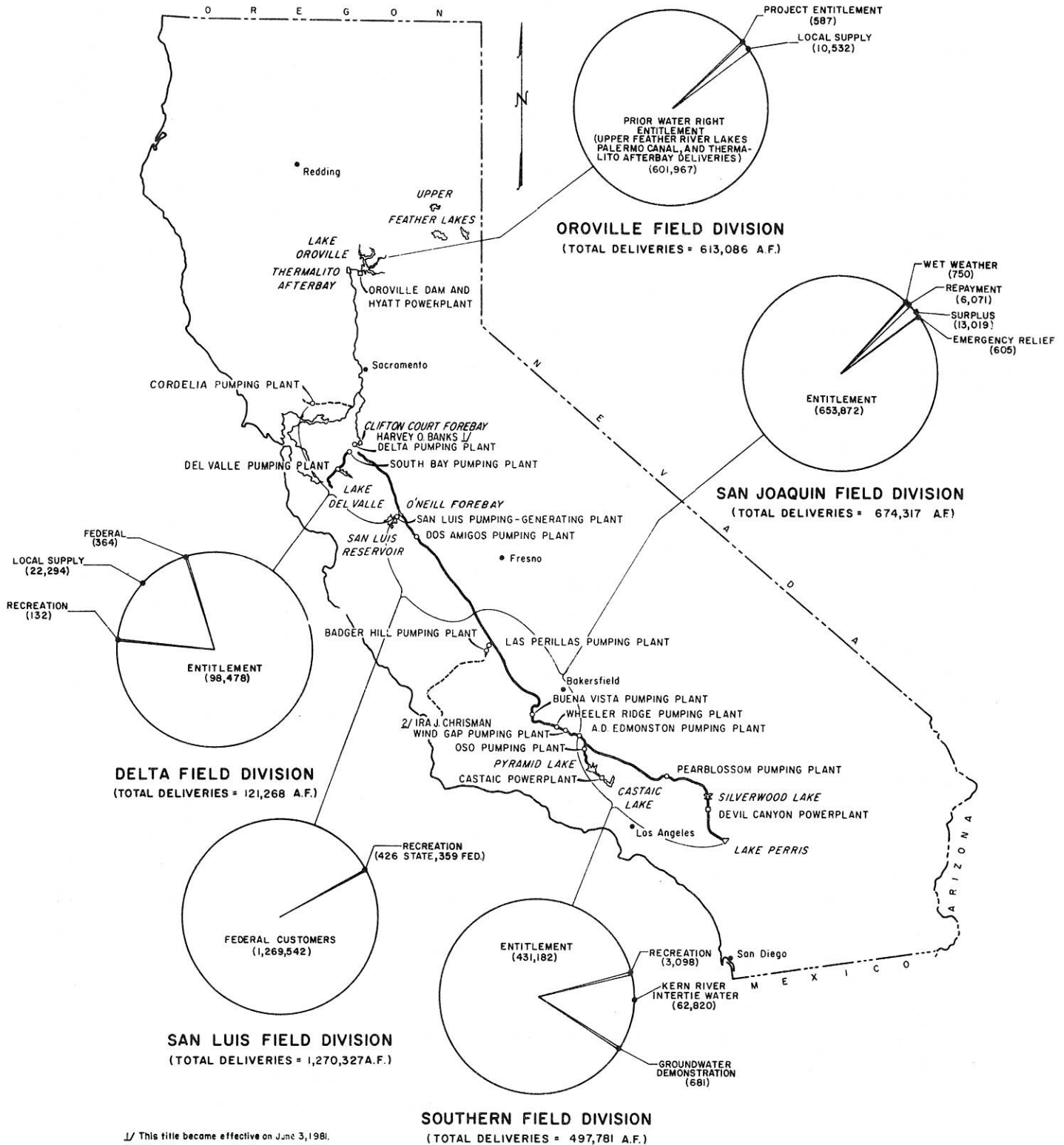
SECTION I

MAP 3

PROJECT WATER DELIVERIES

1983

(in acre-feet)



1/ This title became effective on June 3, 1981.
2/ This title became effective on Jan. 9, 1986.

TABLE 3: WATER DELIVERIES 1962-1983

(in acre-feet)

AGENCY	1962-1978	1979	1980	1981	1982	1983	TOTAL
OROVILLE FIELD DIVISION							
Last Chance Creek W.D. ^{2/}	63,354	8,492	11,800	12,145	10,499	9,073	115,363
Plumas Co. F.C. & W.C.D.	3,334	329	295	355	305	262	4,880
Palermo Canal ^{1/}	87,880	6,540	8,166	6,736	6,493	6,761	122,576
County of Butte	2,623	302	267	221	334	325	4,072
Thermalito I.D. ^{2/}	2,579	1,183	1,327	1,301	763	1,459	8,612
Thermalito Afterbay ^{1/}	8,457,654	857,763	851,578	859,986	754,260	594,409	12,375,650
Upper Feather River Lakes ^{1/}	101,958	1,483	923	1,446	484	797	107,091
DELTA FIELD DIVISION							
Napa Co. F.C. & W.C.D. ^{2/}	50,611	6,561	6,707	9,001	1,213	2,287	76,380
Alameda Co. W.D. ^{2/}	254,705	18,006	26,968	32,365	15,383	12,470	359,897
Alameda Co. F.C. & W.C.D., Zone 7 ^{2/}	164,210	23,409	21,122	22,299	19,055	15,460	265,555
Pleasanton Township W.D.	674	0	0	0	0	0	674
Santa Clara Valley W.D.	362,342	107,989	102,278	106,920	88,564	86,733	854,826
Marin W.D.	4,594	0	0	0	0	0	4,594
San Francisco W.D.	4,345	0	0	0	0	0	4,345
Skylonda M.W.D.	10	0	0	0	0	0	10
Oak Flat W.D. ^{2/}	60,944	6,847	6,418	7,088	4,865	3,822	89,984
Mustang W.D.	4,256	0	0	0	0	0	4,256
Tracy Golf & Country Club	11	330 ^{1/}	425	351 ^{2/}	319 ^{2/}	364 ^{2/}	1,800
Granite Construction	0	0	120	0	0	0	120
East Bay Regional Park District (Lake Del Valle)	369	89	123	121	129	132	963
Orestimba Creek (Spec. Rec. Rel.)	0	100	0	0	0	0	100
SAN LUIS FIELD DIVISION							
Dept. of Parks & Recreation (State's share)	197	72	56	72	49	45	491
Dept. of Fish and Game (State's share)	693	636	688	669	418	381	3,485
Federal Customers (includes fed. rec. water plus joint-use facilities)	8,326,890	1,239,980	1,253,956	1,419,632	1,264,735	1,269,901	14,775,094
Federal Customers (misc. agreements)	0	0	0	1,059	60,000	0	61,059
SAN JOAQUIN FIELD DIVISION							
Tulare Lake Basin W.S.D.	1,031,557	212,963	84,061	299,364	85,916	1,006	1,714,867
Empire West Side I.D.	43,828	1,739	894	8,851	1,287	0	56,599
County of Kings	15,900	2,000	2,200	2,300	1,750	3,550	27,700
Hacienda W.D. ^{4/}	60,195	9,500	6,200	0	0	0	75,895
Kern Co. W.A.	5,287,738	1,290,293	964,933	1,340,581	895,193 ^{1/}	595,112	10,373,850
Dudley Ridge W.D.	525,372	77,089	80,079	73,327	55,463	55,919	867,249
Devil's Den W.D.	141,731	19,136	19,974	23,347	19,059	12,659	235,908
J.G. Boswell Co. ^{8/}	46,705	0	0	40,000	0	0	86,705
Beldridge Oil Co. (formerly Buena Vista W.S.D.) ^{8/}	50,023	5,095	3,159	6,060	5,979	6,071	76,387
Green Valley W.D.	5,257	1,279	1,795	0	0	0	8,331
Federal USBR (U. S. Fish & Wildlife Service)	11,700	0	0	0	0	0	11,700
Federal USBR	127,747	51,733	0	126,839	1,046 ^{2/}	0	317,365
Wheeler Ridge W.S.D.	92	0	0	135,780 ^{2/}	0	0	91
SOUTHERN FIELD DIVISION							
Antelope Valley-East Kern W.A.	114,663	60,493	72,407	79,375	50,291	32,961	410,200
Metropolitan Water District of So. Cal.	2,394,951	507,074 ^{1/}	531,727	795,846	691,749	371,985	5,293,332
Littlerock Creek I.D.	2,959	133	191	1,517	0	38	4,838
Mojave W.A.	733	4,000 ^{1/}	4,000	4,000	10,500 ^{1/}	34,356	57,589
Desert W.A.	57,300	15,000	17,000	19,000	21,000	23,000	152,300
Coachella Valley W.D.	36,884	10,063	10,884	12,105	13,326	14,547	97,809
Crestline-Lake Arrowhead W.A.	5,697	1,260	1,239	1,485	1,238	911	11,830
San Geronimo Pass W.A.	0	0	0	0	0	0	0
San Gabriel Valley M.W.D.	28,900	290	1,085	3,619	12,599	734	47,227
San Bernardino Valley M.W.D.	105,332	18	150 ^{2/}	16,586 ^{4/}	14,137 ^{1/}	6,675 ^{9/}	142,898
Parks & Recreation (Federal, State & County)	2,338	502	781	2,156	2,119	3,098	10,994
Piru Creek Fish Enhancement	2,915	0	0	0	0	0	2,915
Castaic Lake W.A.	0	7	1,210	5,761	9,516	9,476	25,970

^{1/} Prior water right entitlement.

^{2/} Includes regulated delivery of local supply.

^{3/} Conveyance of C.V.P. water.

^{4/} Hacienda Water District was annexed by Tulare Lake Basin in 1981.

^{5/} Includes Green Valley W.D.

^{6/} Includes San Bernardino Valley M.W.D. Ground Water Demonstration of 565 A.F.

^{7/} Ground water demonstration.

^{8/} Repayment of preconsolidation water.

^{9/} Includes 681 acre-feet delivered and stored at State expense, charge will be made upon withdrawal.

^{10/} Pumped from ground water basin by the agency for its use.

^{11/} Includes 50 acre-feet acquired in 1977 for emergency relief purposes and later sold when drought ended.

^{12/} Includes 30,000 acre-feet conveyed to Metropolitan for storage in local ground water basins.

^{13/} Ground water withdrawn as an entitlement delivery.

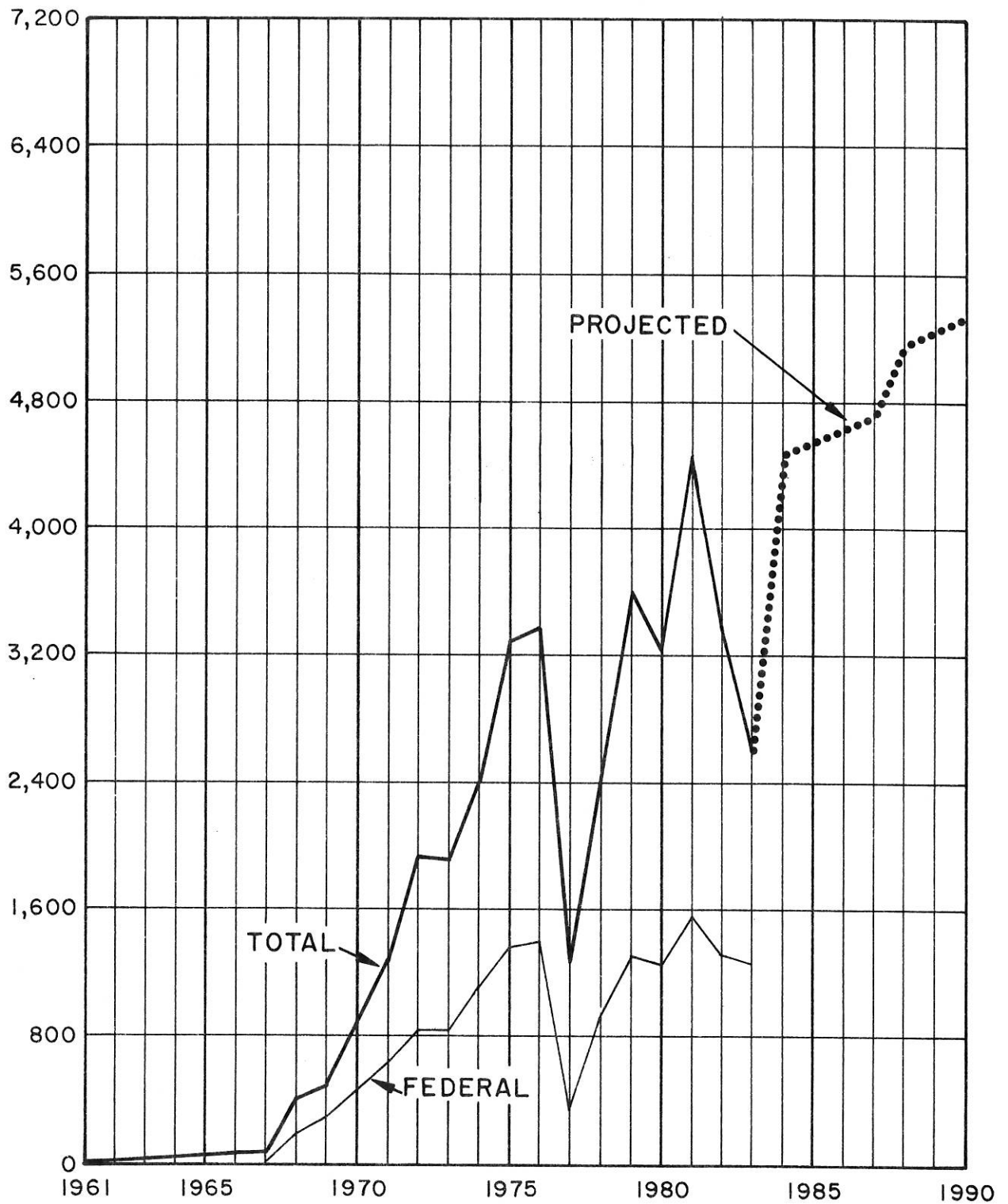
^{14/} Includes 1,650 acre-feet of ground water withdrawn as entitlement and 5,728 acre-feet stored at State expense.

^{15/} Includes 199 acre-feet delivered to Pleasant Valley W.D. in San Luis Field Division.

FIGURE D: CALIFORNIA AQUEDUCT WATER DELIVERIES

YEARLY TOTALS

(in thousands of acre-feet)



Total includes federal deliveries from San Luis joint-use facilities.

SUMMARY OF
CALIFORNIA AQUEDUCT
OPERATION

SECTION II

TABLE 4: SUMMARY OF GOVERNOR EDMUND

1983

(in acre-feet)

DESCRIPTION	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE
<u>DELTA FIELD DIVISION</u>						
North Bay Aqueduct						
Pumped at Cordelia Pumping Plant	96	74	43	50	90	245
Change in Storage	2	6	-8	-5	3	-6
Operational Losses (-), Gains (+)	0	0	0	0	0	0
Delivered to Contracting Agency	94	68	51	55	87	251
California Aqueduct						
Pumped at Harvey O. Banks Delta Pumping Plant	376,737	348,240	82,716	7,270	23,782	108,167
Pumped at South Bay Pumping Plant	1,588	1,699	1,037	1,982	5,928	10,438
Delivered to Contracting Agencies	0	0	0	278	761	912
Change in Storage	233	223	-406	417	266	-131
Outflow at Check 12	381,674	352,286	84,190	4,538	13,970	92,382
Computed Losses (-), Gains (+)	6,758	5,522	2,105	-55	-2,857	-4,566
South Bay Aqueduct						
Pumped at South Bay Pumping Plant	1,588	1,699	1,037	1,982	5,928	10,438
Inflow from Lake Del Valle	4,862	3,386	5,040	5,871	4,391	641
Outflow at Del Valle Pumping Plant	0	0	0	0	0	0
Delivered to Contracting Agencies	4,754	3,801	4,642	6,322	8,394	9,889
Project Water Only						
Del Valle Natural Inflow Exchanged and Released from Aqueduct	296	232	276	284	427	300
Del Valle Nat. Inflow Rel. from Aqueduct	1,390	1,042	1,149	1,251	1,491	641
Del Valle Stored Water Released	0	0	0	0	0	0
Del Valle Stored Exchange and Released from Aqueduct	0	0	0	0	0	254
Change in Storage	0	0	0	0	0	0
Computed Losses (-), Gains (+)	-10	-10	-10	4	-7	5
Lake Del Valle Operation:						
End-of-Month Storage	40,841	42,993	39,985	41,674	40,540	40,483
Change in Storage	3,341	2,152	-3,008	1,689	-1,134	-57
<u>SAN LUIS FIELD DIVISION</u>						
O'Neill Forebay Operation						
End-of-Month Storage	47,835	43,671	47,152	47,283	45,132	44,897
Inflow, California Aqueduct	381,674	352,286	84,190	4,538	13,970	92,382
Inflow, O'Neill P-G Plant	235,352	212,739	246,369	206,762	129,771	108,832
Inflow, San Luis P-G Plant	0	0	180	2,085	2,448	61,026
Change in Storage	-1,214	-4,164	3,481	131	-2,151	-235
Delivered to Federal Customers	130	731	239	1,020	1,535	2,891
Outflow, O'Neill P-G Plant	0	0	0	0	0	0
Outflow, San Luis P-G Plant	544,549	544,049	319,829	142,785	32,407	64,874
Computed Losses (-), Gains (+)	-3,980	-620	-2,821	4,977	1,408	3,778
Outflow, Dos Amigos Pumping Plant	69,588	23,795	4,379	74,437	115,809	198,498
San Luis Reservoir Operation						
State End-of-Month Storage	632,496	985,362	1,069,626	1,060,394	1,059,734	1,058,533
Total End-of-Month Storage	1,002,166	1,545,817	1,869,451	1,997,798	2,022,628	2,018,186
Inflow, San Luis P-G Plant	544,549	544,059	319,829	142,785	32,407	64,874
Change in Storage	537,756	543,651	323,634	128,347	24,830	-4,442
Computed Losses (-), Gains (+)	-6,784	-408	3,985	-12,353	-5,129	-8,290
Outflow, San Luis P-G Plant	0	0	180	2,085	2,448	61,026

G. BROWN CALIFORNIA AQUEDUCT OPERATION

1983
(in acre-feet)

JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	TOTAL	DESCRIPTION
<u>DELTA FIELD DIVISION</u>							
North Bay Aqueduct							
292	288	241	550	227	90	2,286	Pumped at Cordelia Pumping Plant
8	-5	1	2	1	0	-1	Change in Storage
0	0	0	0	0	0	0	Computed Losses (-), Gains (+)
284	293	240	548	226	90	2,287	Delivered to Contracting Agency
California Aqueduct							
70,424	167,707	39,978	20,754	44,719	25,954	1,316,448	Pumped at Harvey O. Banks Delta Pumping Plant
12,719	13,157	8,613	5,050	3,210	1,868	67,489	Pumped at South Bay Pumping Plant
1,262	774	206	35	5	3	4,186	1/ Delivered to Contracting Agencies
-8	-699	376	69	5	-214	-315	Change in Storage
53,661	153,640	28,408	14,617	41,277	23,776	1,244,419	Outflow at Check 12
-2,840	-835	-2,175	-983	-222	-521	-669	Computed Losses (-), Gains (+)
South Bay Aqueduct							
12,719	13,157	8,813	5,050	3,210	1,868	67,489	Pumped at South Bay Pumping Plant
553	0	4,128	6,242	6,252	5,936	47,302	Inflow from Lake Del Valle
0	0	0	0	0	0	0	Outflow At Del Valle Pumping Plant
11,659	11,563	10,904	9,297	7,542	6,021	94,788	2/ Delivered to Contracting Agencies
0	263	274	209	1,918	221	4,700	Project Water Only
529	0	0	0	0	1,555	9,048	Del Valle Natural Inflow Exchanged and Released from Aqueduct
24	0	0	0	0	0	24	Del Valle Nat. Inflow Rel. from Aqueduct
1,059	1,337	1,779	1,806	0	0	6,235	Del Valle Stored Water Released
0	0	0	0	0	0	0	Del Valle Stored Exchange and Released from Aqueduct
-1	6	16	20	-2	-7	4	Change in Storage
39,999	39,822	35,577	29,320	27,830	36,253	---	Computed Losses (-), Gains (+)
-484	-177	-4,245	-6,257	-1,490	18,423	8,753	Lake Del Valle Operation:
							End-of-Month Storage
							Change in Storage
<u>SAN LUIS FIELD DIVISION</u>							
O'Neill Forebay Operation							
45,760	49,341	47,283	48,411	34,114	35,591	---	End-of-Month Storage
53,661	153,640	28,408	14,617	41,277	23,776	1,244,419	Inflow, California Aqueduct
116,901	133,950	166,458	112,384	47,791	94,328	1,811,637	Inflow, O'Neill P-G Plant
142,197	123,986	39,162	0	45,015	92,559	508,658	Inflow, San Luis P-G Plant
863	3,581	-2,058	1,128	-14,297	1,477	-13,458	Change in Storage
4,175	3,713	1,992	434	598	262	17,720	Delivered to Federal Customers
0	0	0	196	0	0	196	Outflow to Federal Customers
47,090	79,467	136,389	65,351	24,344	0	2,001,134	Outflow, San Luis P-G Plant
5,610	5,493	6,545	-1,523	2,857	5,465	27,190	Computed Losses (-), Gains (+)
266,221	330,270	104,230	58,375	126,300	214,410	1,586,312	Outflow, Dos Amigos Pumping Plant
San Luis Reservoir Operation							
1,056,513	1,062,659	1,045,085	1,042,566	1,061,839	1,064,254	---	State End-of-Month Storage
1,913,232	1,856,743	1,939,820	1,998,430	1,975,215	1,888,384	---	Total End-of-Month Storage
47,090	79,467	136,389	65,351	24,334	0	2,001,134	Inflow, San Luis P-G Plant
-104,954	-56,489	83,077	58,610	-23,215	-86,831	1,423,983	Change in Storage
-9,847	-11,970	-14,150	-6,741	-2,534	5,728	-68,493	Computed Losses (-), Gains (+)
142,197	123,986	39,162	0	45,015	92,559	508,658	Outflow, San Luis P-G Plant.

1/ Includes 364 ac-ft of federal CVP water delivered to Tracy Golf and Country Club.
2/ Includes 132 ac-ft of Lake Del Valle recreation water.

TABLE 4: SUMMARY OF GOVERNOR EDMUND

1983
(in acre-feet)

DESCRIPTION	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE
SAN LUIS FIELD DIVISION (Cont.)						
California Aqueduct (Pools 14 thru 21)						
Inflow, Dos Amigos P.P. (State)	12,129	6,575	5,560	1,351	4,003	8,888
Inflow, Dos Amigos P.P. (Federal)	57,459	17,220	-1,181	73,086	111,806	189,610
Inflow, Floodwater	9,053	5,254	16,931	2,722	2,760	0
Inflow, Kern River Intertie (Pumpback)	0	0	0	1,792	8,812	2,821
Change in Storage	-1,193	-185	648	-722	2,296	-189
Delivered to Federal Customers	64,448	21,035	9,199	74,896	112,779	188,067
Computed Losses (-), Gains (+)	2,045	-743	2,635	-3,072	-10,756	-6,213
Outflow, Check 21 (State)	17,416	7,436	14,088	1,688	1,539	7,211
Outflow, Check 21 (Federal)	0	0	0	0	0	0
Delivered to State Contracting Agencies ^{1/}	15	20	10	17	11	17
SAN JOAQUIN FIELD DIVISION						
California Aqueduct, Check 21 to Buena Vista Pumping Plant						
Inflow, Check 21 (State)	17,416	7,436	14,088	1,688	1,539	7,211
Inflow, Check 21 (Federal)	0	0	0	0	0	0
Inflow, Kern River Intertie (State)	29,664	53,753	73,001	62,917	124,015	177,468
Delivered to State Contracting Agencies	6,403	5,454	7,834	25,478	43,462	71,304
Delivered to Federal Customers	0	0	0	0	0	0
Delivered for Repayment of Pre-consolidation Water	562	439	465	470	439	536
Change in Storage	-672	505	-1,023	-63	-255	133
Outflow, Buena Vista P.P.	38,388	53,804	78,655	26,762	53,903	90,211
Outflow, Kern River Intertie (Pumpback)	0	0	0	1,792	8,812	2,821
Coastal Br. Diversion (Las Per. P.P.)	2,001	840	1,848	9,098	14,644	20,149
Computed Losses (-), Gains (+)	-398	-147	690	-1,068	-4,544	475
California Aqueduct, Buena Vista P.P. to Wheeler Ridge P.P.						
Inflow, Buena Vista P.P.	38,388	53,804	78,655	26,762	53,903	90,211
Delivered to State Contracting Agencies	5,662	5,435	4,212	5,030	8,762	18,120
Change in Storage	26	258	-248	-77	356	-130
Outflow, Wheeler Ridge P.P.	32,863	48,547	75,280	21,679	44,811	71,593
Computed Losses (-), Gains (+)	163	436	589	-130	26	-628
California Aqueduct, Wheeler Ridge P.P. to Ira J. Chrisman Wind Gap P.P.						
Inflow, Wheeler Ridge P.P.	32,863	48,547	75,280	21,679	44,811	71,593
Delivered to State Contracting Agencies	483	377	171	3,170	4,867	7,436
Change in Storage	-107	51	13	-32	49	-16
Outflow, Ira J. Chrisman Wind Gap P.P.	31,679	47,593	74,141	18,078	39,710	63,349
Computed Losses (-), Gains (+)	-808	-526	-955	-463	-185	-824
California Aqueduct, Ira J. Chrisman Wind Gap P.P. to A. D. Edmonston P.P.						
Inflow, Ira J. Chrisman Wind Gap P.P.	31,679	47,593	74,141	18,078	-39,710	63,349
Delivered to State Contracting Agencies	334	336	121	1,338	2,662	3,747
Change in Storage	23	84	-12	-31	12	62
Outflow, A. D. Edmonston P.P.	31,972	48,047	75,615	17,125	36,954	60,421
Computed Losses (-), Gains (+)	650	874	1,583	354	-82	881
Coastal Branch, California Aqueduct						
Inflow, Las Perillas P.P.	2,001	840	1,848	9,098	14,649	20,149
Delivered to State Contracting Agencies	1,984	771	1,661	8,651	13,922	19,038
Change in Storage	17	-10	0	-6	0	14
Computed Losses (-), Gains (+)	-20	-79	-187	-453	-727	-1,097

^{1/} Delivered to Department of Fish and Game for State share.

G. BROWN CALIFORNIA AQUEDUCT OPERATION

1983
(in acre-feet)

JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	TOTAL	DESCRIPTION
SAN LUIS FIELD DIVISION (Cont.)							
California Aqueduct, (Pools 14 thru 21)							
55,660	93,519	41,169	13,708	23,938	31,042	297,542	Inflow, Dos Amigos P.P. (State)
210,561	236,751	63,061	44,667	102,362	183,368	1,288,770	Inflow, Dos Amigos P.P. (Federal)
0	0	0	313	0	114	37,147	Inflow, Floodwater
1,028	0	0	0	0	0	14,453	Inflow, Kern River Intertie (Pumpback)
-311	-282	710	-2,479	74	620	-1,013	Change in Storage
208,972	184,658	61,798	43,385	99,609	183,335	1,252,181	Delivered to Federal Customers
-4,530	913	-2,779	-3,138	-6,092	-129	-31,859	Computed Losses (-), Gains (+)
54,045	146,787	38,931	14,633	20,513	30,414	354,701	Outflow, Check 21 (State)
0	0	0	0	0	0	0	Outflow, Check 21 (Federal)
13	20	12	11	12	26	184	Delivered to State Contracting Agencies
SAN JOAQUIN FIELD DIVISION							
California Aqueduct, Check 21 to Buena Vista Pumping Plant							
54,045	94,303	38,931	14,633	20,513	30,414	302,217	Inflow, Check 21 (State)
0	52,484	0	0	0	0	52,484	Inflow, Check 21 (Federal)
151,998	4,568	17,119	12,748	20,048	31,813	759,112	Inflow, Kern River Intertie (State)
95,609	92,173	28,059	9,480	9,633	10,101	404,990	Delivered to State Contracting Agencies
0	0	0	0	0	0	0	Delivered to Federal Customers
550	512	405	483	596	614	6,071	Delivered for Repayment of Pre-consolidation Water
-382	1,430	990	-351	-385	-16	-89	Change in Storage
84,236	42,639	21,761	13,589	26,195	39,424	569,567	Outflow, Buena Vista P.P.
1,028	0	0	0	0	0	14,453	Outflow, Kern River Intertie (Pumpback)
21,242	14,165	6,246	4,289	4,094	7,587	106,203	Coastal Br. Diversion (Las Per. P.P.)
-3,769	-436	1,411	109	-428	-4,517	-12,613	Computed Losses (-), Gains (+)
California Aqueduct, Buena Vista P.P. to Wheeler Ridge P.P.							
84,236	42,639	21,761	13,589	26,195	39,424	569,567	Inflow, Buena Vista P.P.
23,066	20,823	5,873	2,447	2,003	4,572	106,005	Delivered to State Contracting Agencies
-130	228	86	-100	-240	172	201	Change in Storage
61,647	21,950	16,673	11,436	24,573	35,659	466,711	Outflow, Wheeler Ridge P.P.
347	362	871	194	141	979	3,350	Computed Losses (-), Gains (+)
California Aqueduct, Wheeler Ridge P.P. to Ira J. Chrisman Wind Gap P.P.							
61,647	21,950	16,673	11,436	24,573	35,659	466,711	Inflow, Wheeler Ridge P.P.
7,459	4,007	2,729	2,192	2,210	2,325	37,426	Delivered to State Contracting Agencies
-41	58	-8	-48	82	-53	-52	Change in Storage
52,482	17,030	13,387	8,754	21,594	32,259	420,056	Outflow, Ira J. Chrisman Wind Gap P.P.
-1,747	-855	-565	-538	-687	-1,128	-9,281	Computed Losses (-), Gains (+)
California Aqueduct, Ira J. Chrisman Wind Gap P.P. to A. D. Edmonston P.P.							
52,482	17,030	13,387	8,754	21,594	32,259	420,056	Inflow, Ira J. Chrisman Wind Gap P.P.
4,249	3,090	1,287	980	394	769	19,307	Delivered to State Contracting Agencies
-100	-51	130	-141	47	35	58	Change in Storage
49,032	14,054	11,920	7,803	21,650	31,953	406,546	Outflow, A. D. Edmonston P.P.
699	63	-50	-112	497	498	5,855	Computed Losses (-), Gains (+)
Coastal Branch, California Aqueduct							
21,242	14,165	6,246	4,289	4,094	7,587	106,208	Inflow, Las Perillas P.P.
20,223	13,277	5,963	4,032	3,775	7,241	100,518	Delivered to State Contracting Agencies
8	-13	5	-54	48	-12	-3	Change in Storage
-1,011	-901	-278	-311	-271	-358	-5,693	Computed Losses (-), Gains (+)

TABLE 4: SUMMARY OF GOVERNOR EDMUND

1983

(in acre-feet)

DESCRIPTION	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE
<u>SOUTHERN FIELD DIVISION</u>						
California Aqueduct, A. D. Edmonston P.P. to Junction of West Branch						
Inflow, A. D. Edmonston P.P.	31,972	48,047	75,615	17,125	36,954	60,421
Change in Storage	-9	9	-4	-6	-3	-4
Computed Losses (-), Gains (+)	-5	-8	3	-7	-16	-15
Outflow, West Branch	9,328	12,055	10,619	533	4,094	16,120
Outflow, East Branch	22,648	35,975	65,003	16,591	32,847	44,290
California Aqueduct, Junction of West Branch to Pearblossom P.P.						
Inflow	22,648	35,975	65,003	16,591	32,847	44,290
Change in Storage	-226	232	201	-553	273	257
Delivered to Contracting Agencies	484	356	495	2,558	4,551	5,822
Computed Losses (-), Gains (+)	-372	-568	199	-530	-1,210	-1,101
Outflow, Pearblossom P.P.	22,018	34,819	64,506	14,056	26,813	37,110
California Aqueduct, Pearblossom P.P. to Silverwood Lake						
Inflow, Pearblossom P.P.	22,018	34,819	64,506	14,056	26,813	37,110
Change in Storage	-44	38	114	87	-201	-1
Deliveries (Exchange of Natural Inflow)	680	722	983	910	1,003	1,035
Computed Losses (-), Gains (+)	99	-5,220	670	46	246	-1,446
Outflow to Silverwood Lake	21,481	28,839	64,079	13,105	26,257	34,630
Silverwood Lake Operation						
Inflow, Project	21,481	28,839	64,079	13,105	26,257	34,630
Inflow, Natural	4,683	8,115	23,578	7,384	5,234	1,676
Change in Storage	1,541	-5,186	9,333	-4,034	-7,153	7,286
Delivered to Contracting Agencies	100	67	60	57	57	111
Outflow, Natural Inflow Released	3,161	20,109	43,814	4,732	4,580	530
Computed Losses (-), Gains (+)	643	4,079	-4,137	1,037	215	1,714
Outflow, Project Water at San Bernardino Tunnel	22,005	26,043	30,313	20,771	34,222	30,093
California Aqueduct, Silverwood Lake to Lake Perris						
Inflow, San Bernardino Tunnel	22,005	26,043	30,313	20,771	34,222	30,093
Change in Storage	4	5	-6	-7	3	-3
Delivered to Contracting Agencies	20,809	21,064	18,229	20,226	27,338	26,262
Operational Losses (-), Gains (+)	-1	-1	-1	-2	-2	-3
Outflow to Lake Perris	1,191	4,973	12,089	550	6,879	3,831
Lake Perris Operation						
Inflow	1,191	4,973	12,089	550	6,879	3,831
Change in Storage	450	-2,400	7,760	-663	-7,321	-6,803
Delivered to Contracting Agencies	414	6,889	4,430	660	12,015	10,341
Computed Losses (-), Gains (+)	-327	-484	101	-553	-2,185	-293
Outflow	0	0	0	0	0	0

G. BROWN CALIFORNIA AQUEDUCT OPERATION

1983
(in acre-feet)

JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	TOTAL	DESCRIPTION
<u>SOUTHERN FIELD DIVISION</u>							
California Aqueduct, A. D. Edmonston P.P. to Junction of West Branch							
49,032	14,054	11,920	7,803	21,650	31,953	406,546	Inflow, A. D. Edmonston P.P.
9	-4	4	-2	-4	5	-9	Change in Storage
-2	-11	-4	-10	-14	-9	-98	Computed Losses (-), Gains (+)
20,860	3,152	2,524	24	12,252	13,272	104,833	Outflow, West Branch
28,161	10,895	9,388	7,771	9,388	18,667	301,624	Outflow, East Branch
California Aqueduct, Junction of West Branch to Pearblossom P.P.							
28,161	10,895	9,388	7,771	9,388	18,667	301,624	Inflow
-362	-150	305	-66	30	-310	-369	Change in Storage
6,954	4,729	5,136	874	590	450	32,999	Delivered to Contracting Agencies
-180	-810	-273	-710	-1,004	-673	-7,232	Computed Losses (-), Gains (+)
21,389	5,506	3,674	6,253	7,764	17,854	261,762	Outflow, Pearblossom P.P.
California Aqueduct, Pearblossom P.P. to Silverwood Lake							
21,389	5,506	3,674	6,253	7,764	17,854	261,762	Inflow, Pearblossom P.P.
-17	-181	93	-176	290	-150	-148	Change in Storage
909	1,048	1,016	1,078	1,078	988	11,459	Deliveries (Exchange of natural inflow)
-1,507	2	-26	-155	-383	-1,731	-9,405	Computed Losses (-), Gains (+)
18,990	4,641	2,539	5,196	6,004	15,285	241,046	Outflow to Silverwood Lake
<u>Silverwood Lake Operation</u>							
18,990	4,641	2,539	5,196	6,004	15,285	241,046	Inflow, Project
598	429	471	985	864	3,112	57,129	Inflow, Natural
-4,119	-19,296	-19,593	-151	-34	9,371	-32,035	Change in Storage
218	41	112	69	49	72	1,013	Delivered to Contracting Agencies
16	14	30	464	12	2,162	79,624	Outflow, Natural Inflow Released
446	-188	-44	329	484	1,240	5,818	Computed Losses (-), Gains (+)
23,919	24,123	22,417	6,128	7,325	8,032	255,391	Outflow, Project Water at San Bernardino Tunnel
California Aqueduct, Silverwood Lake to Lake Perris							
23,919	24,123	22,417	6,128	7,325	8,032	255,391	Inflow, San Bernardino Tunnel
5	-3	0	-6	3	1	-4	Change in Storage
23,598	16,246	6,825	5,292	6,305	7,317	199,511	Delivered to Contracting Agencies
-3	-3	-2	-2	-1	-1	-22	Operational Losses (-), Gains (+)
313	7,877	15,590	840	1,016	713	55,862	Outflow to Lake Perris
<u>Lake Perris Operation</u>							
313	7,877	15,590	840	1,016	713	55,862	Inflow
-2,872	3,134	14,136	-776	-458	320	4,507	Change in Storage
1,957	3,994	541	494	451	465	42,651	Delivered to Contracting Agencies
-1,228	-749	-913	1,122	-1,023	72	-8,704	Computed Losses (-), Gains (+)
0	0	0	0	0	0	0	Outflow

^{1/} 34,356 ac-ft of this amount was Kern River Intertie inflow delivered to Mojave W.A. in February (16,401 ac-ft) and March (17,955 ac-ft).

TABLE 4: SUMMARY OF GOVERNOR EDMUND

1983

(in acre-feet)

DESCRIPTION	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE
<u>SOUTHERN FIELD DIVISION (Cont.)</u>						
West Branch California Aqueduct Tehachapi Afterbay to Oso P.P.						
Inflow	9,328	12,055	10,619	533	4,094	16,120
Change in Storage	-27	28	-11	-19	-11	-13
Computed Losses (-), Gains (+)	-15	-23	8	-22	-50	-46
Outflow, Oso Pumping Plant	9,340	12,004	10,638	530	4,055	16,087
West Branch California Aqueduct Oso P.P. to Pyramid Lake						
Inflow, Oso P.P.	9,340	12,004	10,638	530	4,055	16,087
Change in Storage	698	-315	0	-53	-953	-244
Operational Losses (-), Gains (+)	107	-16	424	-512	7	0
Outflow through William E. Warne P.P. to Pyramid Lake	8,749	12,303	11,062 ^{2/}	71	5,015	16,331
Pyramid Lake Operation						
End-of-Month Storage	161,558	161,658	158,862	158,813	162,822	154,563
Change in Storage	7,770	100	-2,796	-49	4,009	-8,259
Inflow, Project	9,749	12,303	11,062 ^{2/}	71	5,015	16,331
Inflow, Natural	6,802	10,691	62,807	13,120	9,469	3,655
Inflow, Pumpback from Elderberry Forebay	98,508	106,201	99,138	107,021	118,833	121,611
Computer Losses (-), Gains (+)	-2,213	-2,981	-9,006	-3,191	-6,476	-7,649
Outflow, Angeles Tunnel	100,462	117,925	124,196	106,656	115,218	141,235
Outflow, Natural Inflow released to Piru Creek	3,614	8,189	42,601	10,414	7,614	0
Outflow, Project Water to Piru Creek for Fish Enhancement	0	0	0	0	0	972
Elderberry Forebay Operation						
End-of-Month Storage	26,379	30,573	31,923	30,382	26,335	30,430
Change in Storage	-4,289	4,194	1,350	-1,541	-4,047	4,095
Inflow, Project through Castaic P-G Plant	100,462	117,925	124,196 ^{1/}	106,656	115,218	141,235
Inflow, Natural	1,965	2,607	20,585	3,763	2,670	889
Computed Losses (-), Gains (+)	122	2,318	-9,066	1,100	2,035	2,564
Outflow, Pumpback to Pyramid Lake	98,508	106,201	99,138	107,021	118,833	121,611
Outflow, Project Water Released to Castaic Lake	6,365	9,848	0	2,276	2,467	18,093
Outflow, Natural Inflow Released to Castaic Lake	1,965	2,607	35,227	3,763	2,670	889
Castaic Lake Operation						
End-of-Month Storage	315,865	320,223	319,846	322,070	313,513	297,485
Change in Storage	2,988	4,358	-377	2,224	-8,557	-16,028
Inflow, Project	6,365	9,848	0	2,276	2,467	18,093
Inflow, Natural	3,630	5,305	31,896	6,494	4,944	1,742
Inflow, Natural Releases from Elderberry Forebay	1,965	2,607	35,227	3,763	2,670	889
Delivered to Contracting Agencies	10,880	14,358	25,133	2,229	15,448	39,998
Computed Losses (-), Gains (+)	2,302	956	11,244 ^{1/}	-1,019	-578	3,246
Outflow, Castaic Afterbay	394	0	53,611 ^{1/}	7,061	2,612	0
Castaic Lagoon Operation						
Inflow	394	0	53,611	7,061	2,612	0
Change in Storage	-13	24	28	15	-131	-240
Operational Losses (-), Gains (+)	-39	155	-22	-61	-103	-103
Outflow, Subsurface	190	131	183	181	184	137
Outflow, Surface	178	0	53,378	6,804	2,456	0

^{1/} 14,642 ac-ft of this amount is natural inflow to Pyramid Lake released through Castaic Powerplant to Castaic Lake.

^{2/} Includes 1,050 ac-ft bypassed thorough Gorman Creek Improvement Channel.

G. BROWN CALIFORNIA AQUEDUCT OPERATION

1983
(in acre-feet)

JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	TOTAL	DESCRIPTION
							SOUTHERN FIELD DIVISION (Cont.)
							West Branch California Aqueduct Tehachapi Afterbay to Oso P.P.
20,860	3,152	2,524	24	12,252	13,272	104,833	Inflow
27	-11	11	-5	-12	18	-25	Change in Storage
-7	-33	-11	-29	-42	-28	-298	Computed Losses (-), Gains (+)
20,826	3,130	2,502	0	12,222	13,226	104,560	Outflow, Oso Pumping Plant
							West Branch California Aqueduct Oso P.P. to Pyramid Lake
20,826	3,130	2,502	0	12,222	13,226	104,560	Inflow, Oso P.P.
-595	1,926	-477	-155	-1,065	2,530	1,297	Change in Storage
21	-5	13	-62	24	18	19	Operational Losses (-), Gains (+)
21,442	1,199	2,992	93	13,311	10,714	103,282	Outflow through William E. Warne P.P. to Pyramid Lake
							Pyramid Lake Operation
160,424	156,930	132,767	138,405	143,712	153,401	---	End-of-Month Storage
5,861	-3,494	24,163	5,638	5,307	9,689	-387	Change in Storage
21,442	1,199	2,992	93	13,311	10,714	103,282	Inflow, Project
1,605	1,477	1,446	3,140	2,049	5,922	122,183	Inflow, Natural
129,971	133,605	128,741	112,203	112,912	90,360	1,359,104	Inflow, Pumpback from Elderberry Forebay
-7,887	-6,410	-11,379	-3,433	-5,209	-3,006	-68,840	Computed Losses (-), Gains (+)
138,404	132,511	145,168	105,187	116,678	87,409	1,431,049	Outflow, Angeles Tunnel
0	0	0	1,178	1,078	6,892	81,580	Outflow, Natural Inflow released to to Piru Creek
866	854	795	0	0	0	3,487	Outflow, Project Water to Piru Creek for Fish Enhancement
							Elderberry Forebay Operation
25,632	31,148	32,511	25,719	28,785	29,908	---	End-of-Month Storage
-4,798	5,516	1,363	-6,792	-3,066	1,123	-760	Change in Storage
138,404	132,511	145,168	105,187	116,678	87,409	1,431,049	Inflow, Project through Castaic P-G Plant
281	229	97	587	495	1,238	35,407	Inflow, Natural
2,812	6,381	6,857	1,884	4,320	2,836	24,163	Computed Losses (-), Gains (+)
129,971	133,605	128,741	112,203	112,912	90,360	1,359,104	Outflow, Pumpback to Pyramid Lake
16,043	0	21,921	1,660	5,020	0	83,693	Outflow, Project Water Released to Castaic Lake
281	0	97	587	496	0	48,582	Outflow, Natural Inflow Released to Castaic Lake
							Castaic Lake Operation
293,818	272,867	282,898	276,968	276,112	270,730	---	End-of-Month Storage
-3,667	-20,951	10,031	-5,930	-856	-5,382	-42,147	Change in Storage
16,043	0	21,921	1,660	5,020	0	83,693	Inflow, Project
606	495	330	677	776	2,369	59,264	Inflow, Natural
281	0	97	587	496	0	48,582	Inflow, Natural Releases from Elderberry Forebay
22,454	21,159	13,969	8,874	6,776	5,486	186,764	Delivered to Contracting Agencies
2,203	191	1,764	142	431	16	20,898	Computed Losses (-), Gains (+)
346	478	112	122	803	2,281	67,820	Outflow, Castaic Afterbay
							Castaic Lagoon Operation
346	478	112	122	803	2,281	67,820	Inflow
23	170	-127	-166	388	35	56	Change in Storage
-136	-109	-107	-100	-49	-32	-706	Operational Losses (-), Gains (+)
187	199	132	138	131	134	1,927	Outflow, Subsurface
0	0	0	0	235	2,080	65,131	Outflow, Surface

PUMPING PLANTS

SECTION III

TABLE 5: PROJECT PUMPING PLANTS

1983

(in acre - feet)

PUMPING PLANTS	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	TOTAL
Hyatt	898	0	0	0	0	0	0	0	0	0	20,263	0	21,161
Thermalito	1,176	0	0	0	0	0	0	0	0	0	21,978	0	23,154
Cordelia	96	74	43	50	90	245	292	288	241	550	227	90	2,286
Delta:													
State	376,737	348,117	82,716	7,270	8,342	44,720	70,348	115,154	39,922	20,719	44,714	25,574	1,184,333
Federal	0	123	0	0	15,440	63,447	76	52,553	56	35	5	380	132,115
South Bay	1,588	1,699	1,037	1,982	5,928	10,438	12,719	13,157	8,813	5,050	3,210	1,868	67,489
Del Valle	0	0	0	0	0	0	0	0	0	0	0	0	0
1/ San Luis:													
State	376,384	353,045	82,252	-353	4,611	41,995	41,270	56,382	19,995	1,177	24,334	0	1,001,092
Federal	168,165	191,014	237,577	143,138	27,796	22,879	5,820	23,085	116,394	64,174	0	0	1,000,042
2/ O'Neill:													
Federal	235,352	212,739	246,369	206,762	129,771	108,832	116,901	133,950	166,458	112,384	47,791	94,328	1,811,637
State	0	0	0	0	0	0	0	0	0	0	0	0	0
1/ Dos Amigos:													
State	12,129	6,575	5,560	1,351	4,003	8,888	55,660	93,519	41,169	13,708	23,938	31,042	297,542
Federal	57,459	17,220	-1,181	73,086	111,806	189,610	210,561	236,751	63,061	44,667	102,362	183,368	1,288,770
Las Perillas	2,001	840	1,848	9,098	14,649	20,149	21,242	14,165	6,246	4,289	4,094	7,587	106,208
Badger Hill	2,075	871	1,889	9,445	15,186	20,963	21,403	14,370	6,368	4,402	4,249	7,869	109,090
Buena Vista	38,388	53,804	78,655	26,762	53,903	90,211	84,236	42,639	21,761	13,589	26,195	39,424	569,567
Wheeler Ridge	32,863	48,547	75,280	21,679	44,811	71,593	61,647	21,950	16,673	11,436	24,573	35,659	466,711
Wind Gap	31,679	47,593	74,141	18,078	39,710	63,349	52,482	17,030	13,387	8,754	21,594	32,259	420,056
A. D. Edmonston	31,972	48,047	75,615	17,125	36,954	60,421	49,032	14,054	11,920	7,803	21,650	31,953	406,546
Oso	9,340	12,004	10,638	530	4,055	16,087	20,826	3,130	2,502	0	12,222	13,226	104,560
Castaic	100,462	117,925	124,196	106,656	115,218	141,235	138,404	132,511	145,168	105,187	116,678	87,409	1,431,049
Pearblossom	22,018	34,819	64,506	14,056	26,813	37,110	21,389	5,506	3,674	6,253	7,764	17,854	261,762

1/ Joint State — Federal Facility

2/ O'Neill Pumping Plant is a Federal USBR Facility

SAN LUIS
JOINT – USE FACILITIES

SECTION IV

TABLE 6: MONTHLY OPERATIONS SUMMARY, STATE-FEDERAL SAN LUIS JOINT-USE FACILITIES
1983

(in acre-feet except as noted)

		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Check 12 outflow	State	381674	352163	84190	4538	-1409	28994	53,661	101156	28408	14617	41277	23399	1,112,668
	Federal	0	123	0	0	15379	63388	0	52484	0	0	0	377	131,751
	Total	381674	352286	84190	4538	13970	92382	53,661	153640	28408	14617	41277	23776	1,244,419
O'Neill Pumping and Generating Plant Amount Pumped	State	0	0	0	0	0	0	0	0	0	0	0	0	0
	Federal	235352	212739	246369	206762	129771	108832	116,901	133950	166458	112384	47791	94328	1,811,637
	Total	235352	212739	246369	206762	129771	108832	116,901	133950	166458	112384	47791	94328	1,811,637
Released for Generation	Federal	0	0	0	0	0	0	0	0	0	196	0	0	196
	State	26851	15507	10518	18848	12052	31274	28,582	26664	27281	26180	24412	20867	xxxx
	Federal	20984	28164	36634	28435	33080	13623	17,178	22677	20002	22231	9702	14724	xxxx
O'Neill Forebay End-of-Month Storage	Total	47835	43671	47152	47283	45132	44897	45,760	49341	47283	48411	34114	35591	xxxx
	State	632496	985317	1069581	1060388	1059730	1058142	1,056,513	1062514	1044959	1042428	1061718	1064164	xxxx
	Federal	369670	560500	799870	937410	962898	960044	856,719	794229	894861	956002	913497	824220	xxxx
San Luis Reservoir End-of-Month Storage	Total	1002166	1545817	1869451	1997798	2022628	2018186	1,913,232	1856743	1939820	1998430	1975215	1888384	xxxx
	State	376384	353045	82252	-353	4611	41995	41,270	56382	19995	1177	24334	0	1,001,092
	Federal	168165	191014	237577	143138	27796	22879	5,820	23085	116394	64174	0	0	1,000,042
San Luis Pumping and Generating Plant Amount Pumped	Total	544549	544059	319829	142785	32407	64874	47,090	79467	136389	65351	24334	0	2,001,134
	State	0	0	180	2085	2448	39023	37,483	43797	29768	0	3650	704	159,138
	Federal	0	0	0	0	0	22003	104,714	80189	9394	0	41365	91855	349,520
Released for Generation	Total	0	0	180	2085	2448	61026	142,197	123986	39162	0	45015	92559	508,658
	State	12129	6575	5560	1351	4003	8888	55,660	93519	41169	13708	23938	31042	297,542
	Federal	57459	17220	-1181	73086	111806	189610	210,561	236751	63061	44667	102362	183368	1,288,770
Dos Amigos Pumping Plant Amount Pumped	Total	69588	23795	4379	74437	115809	198498	266,221	330270	104230	58375	126300	214410	1,586,312
	State													
	Federal													

OPERATION OF RESERVOIRS

SECTION V

**TABLE 7: UPPER FEATHER AREA LAKES MONTHLY OPERATION
1983**

(in acre-feet except as noted)

Month	Lake Storage			Outflow							Inflow
	Water Surface* Elevation in feet	Storage*	Storage Change	Regulated			Release	Spill	Estimated Evaporation and Seepage	Total Outflow	Computed or Estimated
				Streamflow Maint.	Water Supply Contract	Water Right Entitlement					
	1	2	3	4	5	6	7	8	9	10	11

ANTELOPE LAKE

Capacity 22,566 ac-ft

Jan	5002.26E	22,806	1,303	1,230	0	0	1,230	60E	64	1,354	2,657
Feb	5002.76	23,276	470	1,111	0	0	1,111	3,051	75	4,237	4,707
Mar	5003.21	23,704	428	539	0	0	539	11,223	114	11,876	12,304
Apr	5003.31	23,800	96	0	0	0	0	12,546	191	12,737	12,833
May	5004.54	24,995	1,195	0	0	0	0	28,541	310	28,851	30,046
June	5002.75	23,267	-1,728	0	0	0	0	19,508	500	20,008	18,280
July	5001.70	22,287	-980	2,336	0	0	2,336	1,514	652	4,502	3,522
Aug	5001.07	21,711	-576	1,325	0	0	1,325	0	530	1,855	1,279
Sept	5000.12	20,859	-852	1,190	0	0	1,190	0	465	1,655	803
Oct	4999.85	20,612	-247	1,031	0	0	1,031	0	238	1,269	1,022
Nov	5002.39	22,928	2,316	1,190	0	0	1,190	485	145	1,820	4,136
Dec	5002.92	23,428	500	1,230	0	0	1,230	3,673	103	5,006	5,506
Tot			1,925	11,182	0	0	11,182	80,601	3,387	95,170	97,095

FRENCHMAN LAKE

Capacity 55,477 ac-ft

Jan	5584.44	50,031	2,276	123	0	0	123	0	102	225	2,501
Feb	5587.21	54,236	4,223	198	0	0	198	0	106	304	4,527
Mar	5588.25	55,871	1,635	9,269	0	0	9,269	3,945	190	13,404	15,039
Apr	5588.93	56,957	1,086	10,413	0	0	10,413	4,179	319	14,911	15,997
May	5590.24	59,088	2,131	7,087	0	0	7,087	18,004	536	25,627	27,758
June	5588.31	55,967	-3,121	166	302	0	468	12,312	839	13,619	10,498
July	5586.67	53,400	-2,567	0	2,583	0	2,583	200	1,098	3,881	1,314
Aug	5584.16	49,618	-3,782	0	3,792	0	3,792	0	867	4,659	877
Sept	5582.69	47,482	-2,136	0	2,053	0	2,053	0	754	2,807	671
Oct	5582.79	47,625	143	30	236	0	266	0	387	653	796
Nov	5585.46	51,555	3,930	87	107	0	194	0	234	428	4,358
Dec	5588.90	56,909	5,354	393	0	0	393	1,015	171	1,579	6,933
Tot			9,172	27,766	9,073	0	36,839	39,655	5,603	82,097	91,269

LAKE DAVIS

Capacity 84,371 ac-ft

Jan	5772.08	73,056	-4,586	7,873	0	0	7,873	0	264	8,137	3,551
Feb	5771.73	71,757	-1,299	7,119	0	0	7,119	0	259	7,378	6,079
Mar	5771.62	71,352	-405	14,222	0	0	14,222	0	446	14,668	14,263
Apr	5770.87	68,620	-2,732	14,095	0	0	14,095	0	723	14,818	12,086
May	5774.36	81,819	13,199	11,655	20	71	11,746	0	1,230	12,976	26,175
June	5774.91	84,009	2,190	5,177	58	179	5,414	47	2,008	7,469	9,659
July	5774.24	81,344	-2,665	1,020	68	184	1,272	0	1,989	3,261	596
Aug	5773.57	78,724	-2,620	1,045	64	184	1,293	0	1,955	3,248	628
Sept	5773.02	76,606	-2,118	1,012	42	179	1,233	0	2,000	3,233	1,115
Oct	5772.85	75,957	-649	1,230	5	0	1,235	0	1,026	2,261	1,612
Nov	5774.23	81,305	5,348	2,596	3	0	2,599	0	621	3,220	8,568
Dec	5774.43	82,096	791	9,662	2	0	9,664	0	432	10,096	10,887
Tot			4,454	76,706	262	797	77,765	47	12,953	90,765	95,219

E = Estimated value.

*At end of month.

TABLE 8: LAKE OROVILLE

MONTHLY OPERATION

(in acre-feet except as noted)

MONTH	YEAR	WATER SURFACE * ELEVATION (in feet)	STORAGE *	STORAGE CHANGE	OUTFLOW						TOTAL INFLOW	
					POWER	PALERMO CANAL	SPILLWAY LEAKAGE	EVAPORATION	SPIII	TOTAL OUTFLOW	PUMPBACK	INFLOW ^{1/}
JAN	1983	849.69	2,804,192	-4,558	543,430	76	190	685	145,896	690,277	898	684,821
	1982	847.74	2,778,149	-83,260	680,072	64	192	797	50,413	731,538	0	684,278
FEB	1983	854.47	2,868,755	64,563	720,593	72	111	993	339,179	1,060,948	0	1,125,511
	1982	860.74	2,955,020	176,871	620,046	134	176	1,455	229,168	850,979	0	1,027,850
MAR	1983	851.95	2,834,589	-34,166	875,439	75	12	1,128	1,111,944	1,988,598	0	1,954,432
	1982	864.64	3,009,590	54,570	705,174	236	465	1,954	0	707,829	2,213	760,186
APR	1983	859.32	2,935,325	100,736	889,024	169	196	2,974	1,256	893,619	0	994,355
	1982	882.83	3,273,571	263,981	870,166	252	235	3,923	428,772	1,303,348	0	1,567,329
MAY	1983	885.22	3,309,445	374,120	844,811	446	607	6,138	0	852,002	0	1,226,122
	1982	898.54	3,514,556	240,985	652,768	839	1,624	8,203	0	663,434	0	904,419
JUN	1983	897.06	3,491,329	181,884	687,072	1,190	1,954	8,682	0	698,898	0	880,782
	1982	896.98	3,490,077	-24,479	420,543	1,071	1,684	8,280	0	431,578	0	407,099
JUL	1983	883.88	3,289,297	-202,032	558,973	1,250	1,819	10,883	0	572,925	0	370,893
	1982	885.81	3,318,345	-171,732	405,078	1,059	1,632	10,666	0	418,435	0	246,703
AUG	1983	866.52	3,036,148	-253,149	485,418	1,230	1,004	10,525	0	498,177	0	245,028
	1982	863.97	3,000,165	-318,180	502,998	1,116	934	10,034	0	515,082	170	196,732
SEP	1983	850.74	2,818,286	-217,862	416,706	1,160	311	8,731	0	426,908	0	209,046
	1982	847.51	2,775,088	-225,077	405,436	866	262	7,127	0	413,691	1,987	186,627
OCT	1983	844.24	2,731,831	-86,455	237,940	835	10	4,821	0	243,606	0	157,151
	1982	845.14	2,743,689	-31,399	256,287	670	135	4,530	0	261,622	7,917	222,306
NOV	1983	852.18	2,837,695	105,864	470,915	188	60	1,031	89,106	561,300	20,263	646,901
	1982	851.59	2,829,731	-86,042	269,129	122	206	1,588	0	271,045	17,296	339,791
DEC	1983	851.67	2,830,810	-6,885	879,101	70	58	384	444,512	1,324,125	0	1,317,240
	1982	850.03	2,808,750	-20,981	542,426	64	185	1,284	86,185	630,144	1,708	607,455
TOTAL	1983			22,060	7,609,422	6,761	6,332	56,975	2,131,893	9,811,383	21,161	9,812,282
	1982			-52,659	6,330,123	6,493	7,730	59,841	794,538	7,198,725	31,291	7,114,775

*At end of month.

^{1/} Computed inflow excluding pumpback.

FIGURE E: LAKE OROVILLE OPERATION

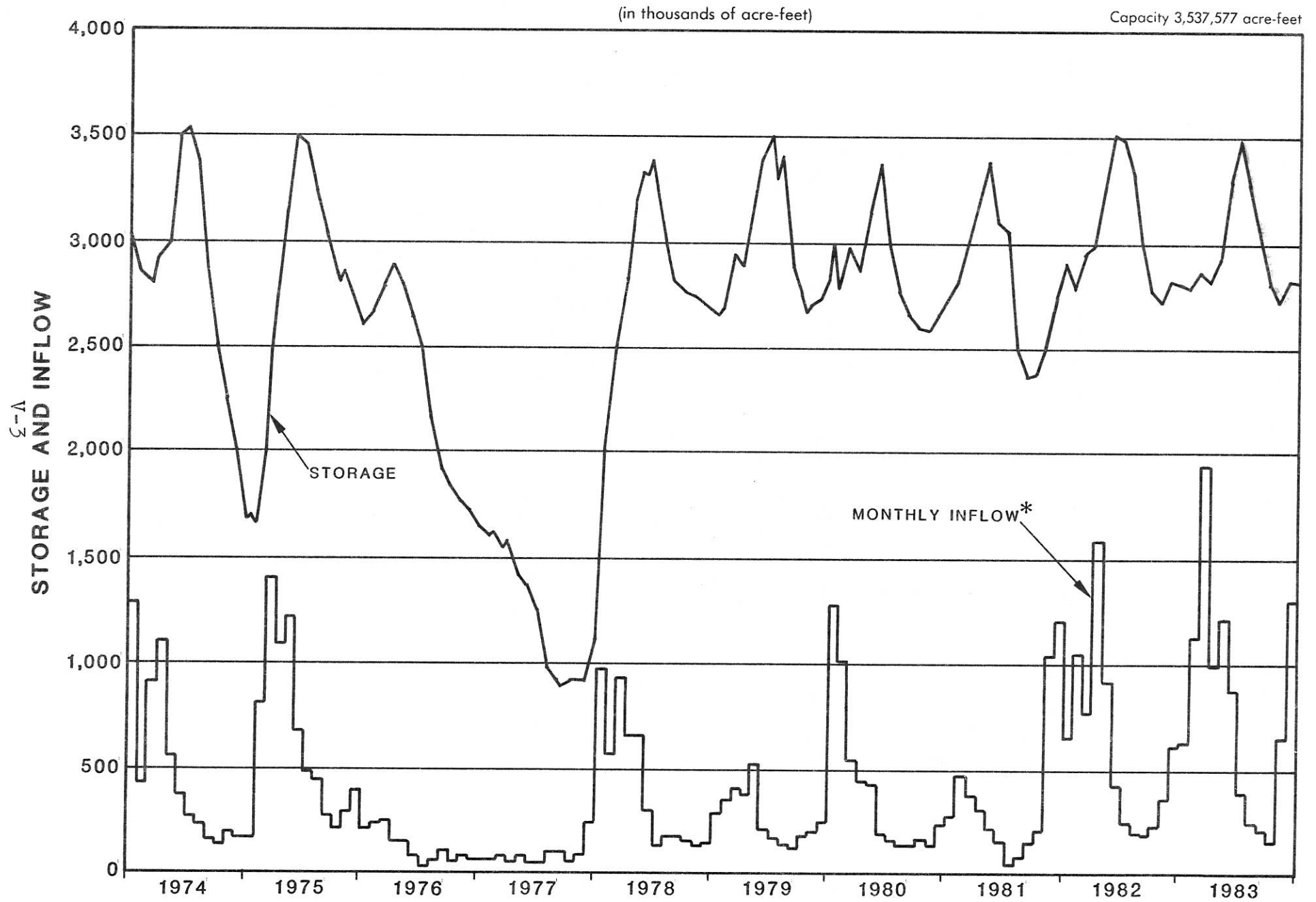


FIGURE F: OPERATION OF LAKE OROVILLE FOR FLOOD CONTROL

1982-1983

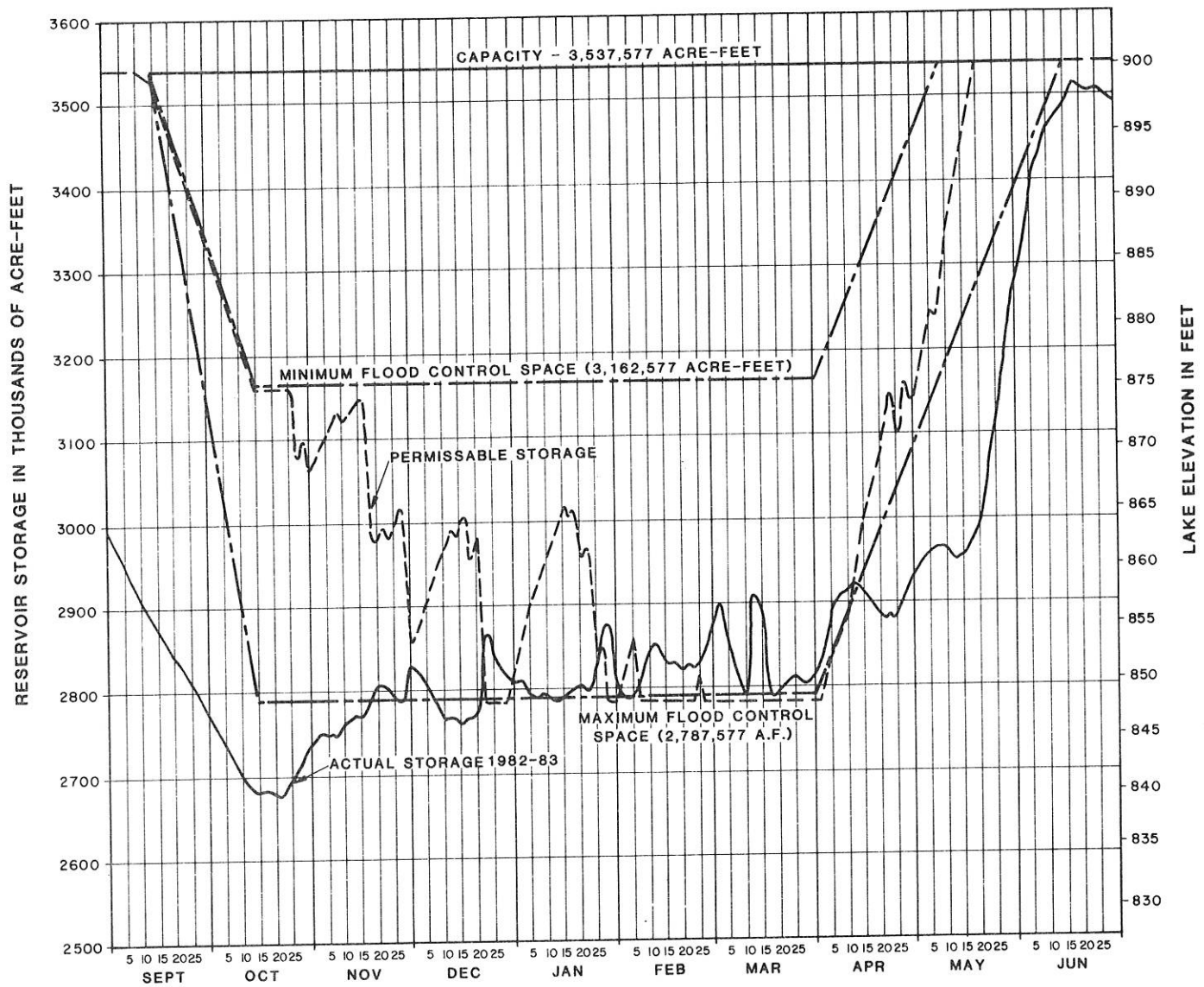


FIGURE G: LAKE OROVILLE ISOTHERMS
1983

(temperature in degrees fahrenheit)

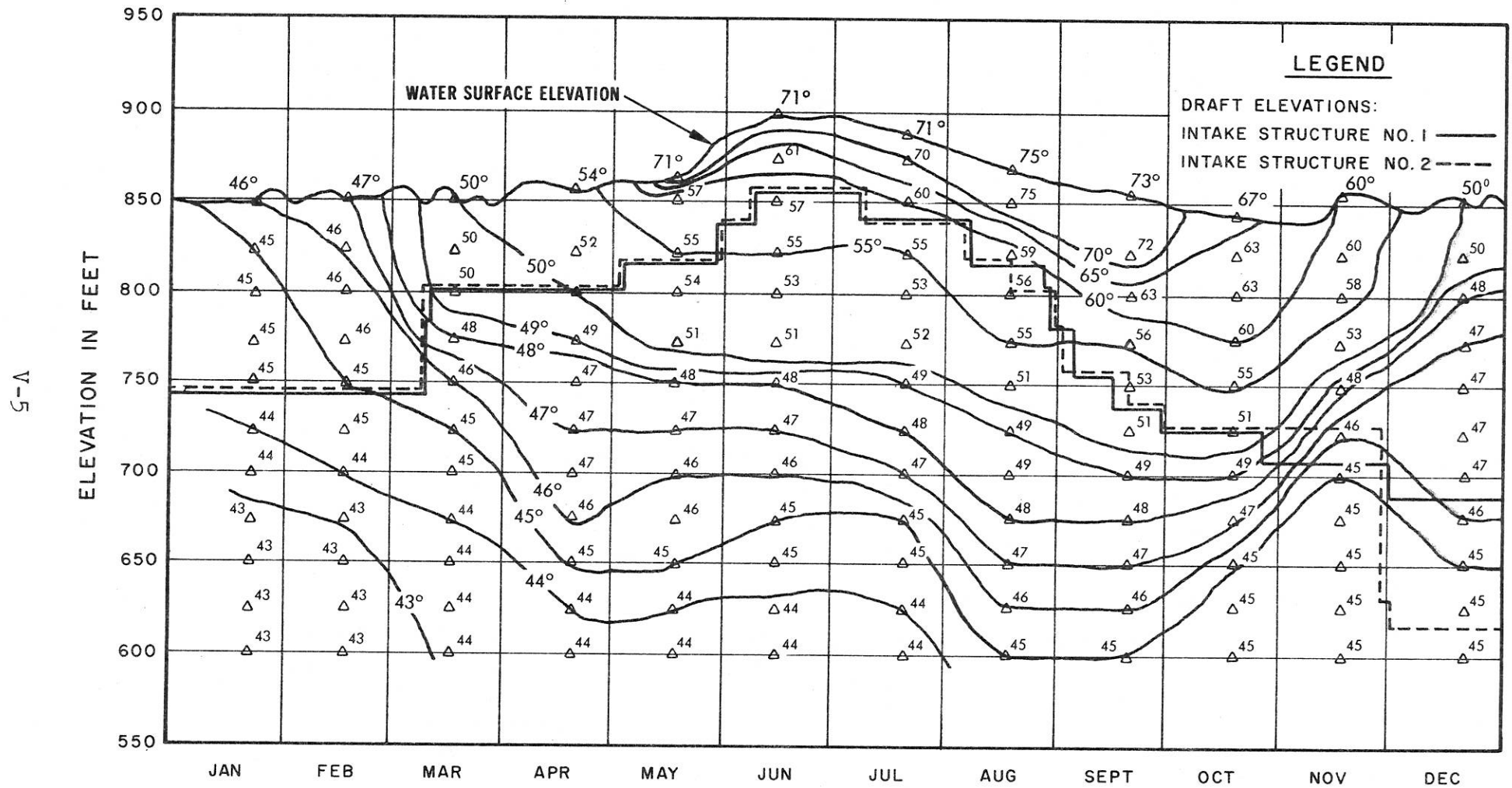


TABLE 9: OROVILLE - THERMALITO COMPLEX
MONTHLY STORAGE *

(elevation in feet, storage in acre-feet)

MONTH	YEAR	THERMALITO DIVERSION DAM POOL		THERMALITO FOREBAY		THERMALITO AFTERBAY	
		ELEVATION	STORAGE	ELEVATION	STORAGE	ELEVATION	STORAGE
JANUARY	1983	224.74	13,269	222.84	10,438	127.89	25,502
	1982	224.25	13,111	223.28	10,704	125.54	18,960
FEBRUARY	1983	223.70	12,936	220.66	9,154	128.00	25,831
	1982	224.91	13,323	222.82	10,425	127.89	25,502
MARCH	1983	224.17	13,086	222.10	9,995	127.80	25,235
	1982	224.14	13,076	222.34	10,138	126.77	22,272
APRIL	1983	224.54	13,204	221.24	9,490	127.14	23,316
	1982	223.00	12,714	221.20	9,466	126.26	20,870
MAY	1983	224.28	13,121	220.90	9,292	131.23	36,361
	1982	223.88	12,993	222.82	10,425	127.84	25,353
JUNE	1983	223.26	12,796	222.96	10,510	128.74	28,093
	1982	223.26	12,796	222.94	10,498	127.17	23,401
JULY	1983	224.47	13,182	224.26	11,305	129.02	28,972
	1982	221.83	12,348	221.12	9,420	126.70	22,077
AUGUST	1983	223.88	12,993	223.52	10,850	128.40	27,042
	1982	224.06	13,050	223.38	10,765	127.24	23,602
SEPTEMBER	1983	224.21	13,098	224.30	11,330	130.35	33,325
	1982	223.11	12,749	223.18	10,643	127.21	23,516
OCTOBER	1983	223.80	12,967	223.80	11,021	129.93	31,919
	1982	222.00	12,400	222.38	10,162	125.40	18,598
NOVEMBER	1983	224.54	13,204	222.42	10,186	129.02	28,972
	1982	223.92	13,006	222.34	10,138	127.61	24,675
DECEMBER	1983	224.91	13,323	222.18	10,043	132.08	39,412
	1982	223.59	12,901	222.96	10,510	127.47	24,266

*At end of month.

TABLE 10: CLIFTON COURT FOREBAY

MONTHLY OPERATION

(elevation in feet, storage in acre-feet)

MONTH	YEAR	WATER SURFACE * ELEVATION	END OF MONTH STORAGE *	STORAGE CHANGE	INFLOW
JANUARY	1983	3.69	26,238	2,903	379,642
	1982	0.72	19,815	-4,321	206,311
FEBRUARY	1983	2.09	22,773	-3,465	344,774
	1982	0.88	20,160	345	311,766
MARCH	1983	2.89	24,504	1,731	83,158
	1982	1.10	20,634	474	383,165
APRIL	1983	2.44	23,530	-974	6,690
	1982	0.86	20,117	-517	362,906
MAY	1983	1.83	22,211	-1,319	24,818
	1982	0.69	19,750	-367	182,595
JUNE	1983	3.13	25,024	2,813	117,481
	1982	2.47	23,595	3,845	56,758
JULY	1983	0.80	19,987	-5,037	72,201
	1982	1.38	21,239	-2,356	64,005
AUGUST	1983	1.15	20,742	755	174,169
	1982	1.36	21,196	-43	225,858
SEPTEMBER	1983	2.00	22,578	1,836	45,486
	1982	2.17	22,946	1,750	188,404
OCTOBER	1983	1.77	22,081	-497	21,130
	1982	0.84	20,073	-2,873	182,952
NOVEMBER	1983	1.58	21,671	-410	43,583
	1982	2.85	24,417	4,344	158,363
DECEMBER	1983	3.17	25,110	3,439	29,753
	1982	2.35	23,335	-1,082	321,479
TOTAL	1983	--	--	1,775	1,342,885
	1982	--	--	-801	2,644,562

*At end of month.

TABLE 11: LAKE DEL VALLE
MONTHLY OPERATION
1983

(in acre-feet except as noted)

MONTH	WATER* SURFACE ELEVATION (in feet)	STORAGE*	STORAGE CHANGE	INFLOW		OUTFLOW					PRECIPITATION (in inches)
				NATURAL	SOUTH BAY AQUEDUCT	SOUTH BAY AQUEDUCT	RECREA- TION 1/	ARROYO VALLE	TOTAL	EVAPORA- TION (in feet)	
JANUARY	704.30	40,841	3,341	34,955	0	4,862	0	26,678	31,540	.1433	6.99
FEBRUARY	707.25	42,993	2,152	26,743	0	3,386	0	21,144	24,530	.1283	5.07
MARCH	703.10	39,985	-3,008	39,907	0	5,040	0	37,791	42,831	.1808	6.19
APRIL	705.46	41,674	1,689	8,726	0	5,871	0	998	6,869	.3375	3.37
MAY	703.88	40,540	-1,134	4,533	0	4,391	0	1,002	5,393	.5590	.25
JUNE	703.80	40,483	-57	941	0	641	0	0	641	.6950	.00
JULY	703.12	39,999	-484	529	0	553	0	0	553	.8700	.01
AUGUST	702.87	39,822	-177	263	0	0	0	0	0	.7792	.49
SEPTEMBER	696.65	35,577	-4,245	274	0	4,128	0	0	4,128	.6500	.42
OCTOBER	686.50	29,320	-6,257	209	0	6,242	0	0	6,242	.3642	.21
NOVEMBER	683.85	27,830	-1,490	4,845	0	6,252	0	0	6,252	.1550	6.16
DECEMBER	697.67	36,253	18,423	15,575	0	5,936	0	1,168	7,104	.0900	0.00
TOTAL	--	--	8,753	137,500	0	47,302	0	88,781	136,083	4.9523	29.16

*At end of month.

1/ To East Bay Regional Park District.

TABLE 12: O'NEILL FOREBAY

MONTHLY OPERATION

1983

(in acre-feet except as noted)

MONTH	YEAR	RESERVOIR STORAGE			INFLOW			OUTFLOW				COMPUTED LOSSES (-) GAINS (+)
		WATER SURFACE * ELEVATION (in feet)	STORAGE *	MONTHLY STORAGE CHANGE	O'NEILL P-G PLANT PUMPING	SAN LUIS P-G PLANT GENERATION	CALIFORNIA AQUEDUCT CHECK 12	O'NEILL P-G PLANT GENERATION	SAN LUIS P-G PLANT PUMPING	DOS AMIGOS PUMPING	DELIVERIES	
JANUARY	1983	221.79	47,835	-1,214	235,352	0	381,674	0	544,549	69,588	136	-3,967
	1982	221.88	48,071	-3,082	83,063	2,198	211,116	0	0	298,442	317	-700
FEBRUARY	1983	220.20	43,671	-4,164	212,739	0	352,286	0	544,059	23,795	731	-604
	1982	218.64	39,674	-8,397	141,667	0	308,374	0	171,453	279,336	423	-7,226
MARCH	1983	221.53	47,152	3,481	246,369	180	84,190	0	319,829	4,379	238	-2,812
	1982	219.70	42,376	2,702	214,458	0	383,002	0	428,986	188,090	652	22,970
APRIL	1983	221.58	47,283	131	206,762	2,085	4,538	0	142,785	74,437	1,022	4,990
	1982	220.02	43,204	828	199,012	288	364,386	0	425,341	124,685	786	-12,046
MAY	1983	220.76	45,132	-2,151	129,771	2,448	13,970	0	32,407	115,809	1,541	1,417
	1982	223.42	52,169	8,965	117,671	2,539	167,111	0	8,230	254,782	2,575	-12,769
JUNE	1983	220.67	44,897	-235	108,832	61,026	92,382	0	64,874	198,498	2,900	3,797
	1982	222.58	49,926	-2,243	64,031	308,069	33,170	10,746	0	380,527	3,532	-12,708
JULY	1983	221.00	45,760	863	116,901	142,197	53,661	0	47,090	266,221	4,211	5,626
	1982	221.44	46,915	-3,011	4,882	462,550	43,224	46,825	0	456,002	3,917	-6,923
AUGUST	1983	222.36	49,341	3,581	133,950	123,986	153,640	0	79,467	330,270	3,767	5,509
	1982	223.73	53,001	6,086	21,966	247,953	204,528	7,614	0	449,774	4,689	-6,284
SEPTEMBER	1983	221.58	47,283	-2,058	166,458	39,162	28,408	0	136,389	104,230	2,022	6,555
	1982	222.01	48,411	-4,590	13,277	41,186	173,322	11,992	932	216,901	2,237	-313
OCTOBER	1983	222.01	48,411	1,128	112,384	0	14,617	196	65,351	58,375	437	-1,514
	1982	218.50	39,322	-9,089	47,043	14,095	183,140	7,133	45,738	198,469	630	-1,397
NOVEMBER	1983	216.35	34,114	-14,297	47,791	45,015	41,277	0	24,334	126,300	613	2,867
	1982	220.61	44,740	5,418	193,941	0	153,879	0	137,282	196,029	103	-8,988
DECEMBER	1983	216.98	35,591	1,477	94,328	92,559	23,776	0	0	214,410	262	5,486
	1982	222.25	49,049	4,309	195,862	85	321,752	0	291,156	225,706	116	3,588
TOTAL	1983	--	--	-13,458	1,811,637	508,658	1,244,419	196	2,001,134	1,586,312	17,880	27,350
	1982	--	--	-2,104	1,214,640	1,078,963	2,547,004	84,310	1,509,118	3,268,743	19,977	-42,796

*At end of month.

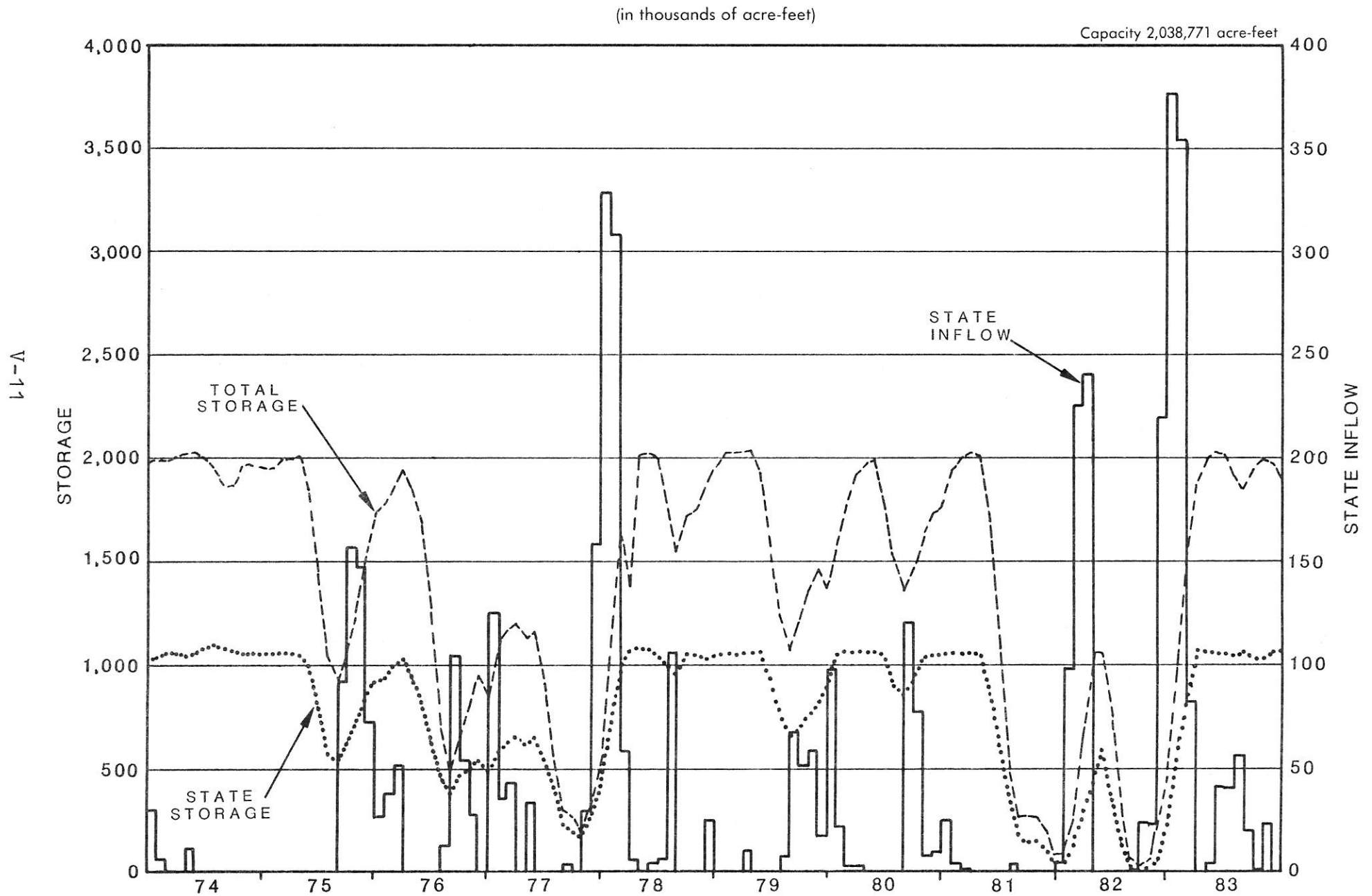
TABLE 13: SAN LUIS RESERVOIR
MONTHLY OPERATION
1983

(in acre-feet except as noted)

MONTH	YEAR	RESERVOIR STORAGE			INFLOW	OUTFLOW			COMPUTED LOSSES (-) GAINS (+)	EVAPORATION (in feet)	PRECIPITATION (in inches)
		WATER SURFACE * ELEVATION (in feet)	STORAGE *	MONTHLY STORAGE CHANGE	SAN LUIS P-G PLANT PUMPING	SAN LUIS P-G PLANT GENERATION	PACHECO TUNNEL (FUTURE FACILITY)				
JANUARY	1983	453.00	1,002,166	537,765	544,549	0			-6,784	603	3.34
	1982	362.56	81,248	1,981	0	2,198			4,179	296	1.96
FEBRUARY	1983	503.31	1,545,817	543,651	544,059	0			-408	1,129	2.51
	1982	361.10	249,922	168,674	171,453	0			-2,779	706	1.32
MARCH	1983	530.36	1,869,451	323,634	319,829	180			3,985	2,128	3.96
	1982	414.43	642,244	392,322	428,986	0			-36,664	1,496	2.76
APRIL	1983	540.63	1,997,798	128,347	142,785	2,085			-12,353	4,767	1.45
	1982	459.17	1,064,590	422,346	425,341	288			-2,707	4,161	1.55
MAY	1983	542.59	2,022,628	24,830	32,407	2,448			-5,129	8,983	.06
	1982	459.19	1,064,794	204	8,230	2,539			-5,487	8,343	.00
JUNE	1983	542.24	2,018,186	-4,442	64,874	61,026			-8,290	11,617	.00
	1982	427.90	761,682	-303,112	0	308,069			4,957	8,309	.36
JULY	1983	533.89	1,913,232	-104,954	47,090	142,197			-9,847	13,091	.00
	1982	370.36	307,807	-453,875	0	462,550			8,675	8,412	.00
AUGUST	1983	529.33	1,856,743	-56,489	79,467	123,986			-11,970	11,961	.94
	1982	321.37	63,452	244,355	0	247,953			3,598	4,998	.00
SEPTEMBER	1983	536.02	1,939,820	83,077	136,389	39,162			-14,150	8,620	1.34
	1982	304.99	23,476	-39,976	932	41,186			278	1,341	.78
OCTOBER	1983	540.68	1,998,430	58,610	65,351	0			-6,741	4,762	.62
	1982	318.39	54,306	30,830	45,738	14,095			-813	581	.99
NOVEMBER	1983	538.84	1,975,215	-23,215	24,334	45,015			-2,534	2,053	2.53
	1982	350.84	191,458	137,152	137,282	0			-130	349	3.07
DECEMBER	1983	531.89	1,888,384	-86,831	0	92,559			5,728	1,182	3.15
	1982	392.48	464,401	272,943	291,156	85			-18,128	708	1.53
TOTAL	1983	---	---	1,423,983	2,001,134	508,658			-68,493	70,896	19.90
	1982	---	---	385,134	1,509,118	1,078,963			-45,021	39,700	14.32

*At end of month.

FIGURE H: SAN LUIS RESERVOIR OPERATION



**TABLE 14: PYRAMID LAKE
MONTHLY OPERATION
1983**

(in acre-feet except as noted)

MONTH	WATER * SURFACE ELEVATION (in feet)	TOTAL * STORAGE 1/	STORAGE CHANGE	INFLOW			OUTFLOW					COMPUTED LOSSES (-) GAINS (+)
				NATURAL	PROJECT		ANGELES TUNNEL	TO PIRU CREEK				
					WARNE POWER- PLANT	PUMPBACK 2./		NATURAL INFLOW RELEASE 3/	PROJECT WATER FOR FISH ENHANCEMENT			
										SURFACE		
JAN	2571.43	(2,697) 161,558 5/	7,770	6,802	8,749	98,508	100,462	3,614	--	--	--	-2,213
FEB	2571.51	(5,199) 161,658 5/	100	10,691	12,303	106,201	117,925	8,189	--	--	--	-2,981
MAR	2569.26	(5,564) 158,862 5/	-2,796	62,807	11,062	99,138	124,196 ^{4/}	42,601	--	--	--	-9,006
APR	2569.22	(2,706) 158,813 5/	-49	13,120	71	107,021	106,656	10,414	--	--	--	-3,191
MAY	2572.44	(1,855) 162,822 5/	4,009	9,469	5,015	118,833	115,218	7,614	--	--	--	-6,476
JUN	2565.75	(3,655) 154,563 5/	-8,259	3,655	16,331	121,611	141,235	0	--	972	--	-7,649
JUL	2570.52	(1,605) 160,424 5/	5,861	1,605	21,442	129,971	138,404	0	--	866	--	-7,887
AUG	2567.69	(1,477) 156,930 5/	-3,494	1,477	1,199	133,605	132,511	0	--	854	--	-6,410
SEP	2546.97	(1,446) 132,767 5/	-24,163	1,446	2,992	128,741	145,168	0	--	795	--	-11,379
OCT	2551.99	(1,962) 138,405	5,638	3,140	93	112,203	105,187	1,178	--	--	--	-3,433
NOV	2556.61	(2,933) 143,712	5,307	2,049	13,311	112,912	116,678	1,078	--	--	--	-5,209
DEC	2564.79	(1,963) 153,401	9,689	5,922	10,714	90,360	87,409	6,892	--	--	--	-3,006
TOTAL			-387	122,183	103,282	1,359,104	1,431,049	81,580	--	3,487	--	-68,840

*At end of month.

1/ Natural inflow storage shares shown in brackets.

2/ Pumpback by Los Angeles Department of Water and Power (LADWP) through Castaic Powerplant.

3/ Portion of these amounts used to satisfy fishery enhancement agreement.

4/ 14,462 ac-ft released thru Castaic Powerplant and to Castaic Lake was from natural inflow.

5/ According to Permit No. 18709 this water becomes property of SWP and is included in total storage amounts. Total 1983 = 23,507 ac-ft.

FIGURE I: PYRAMID LAKE OPERATION

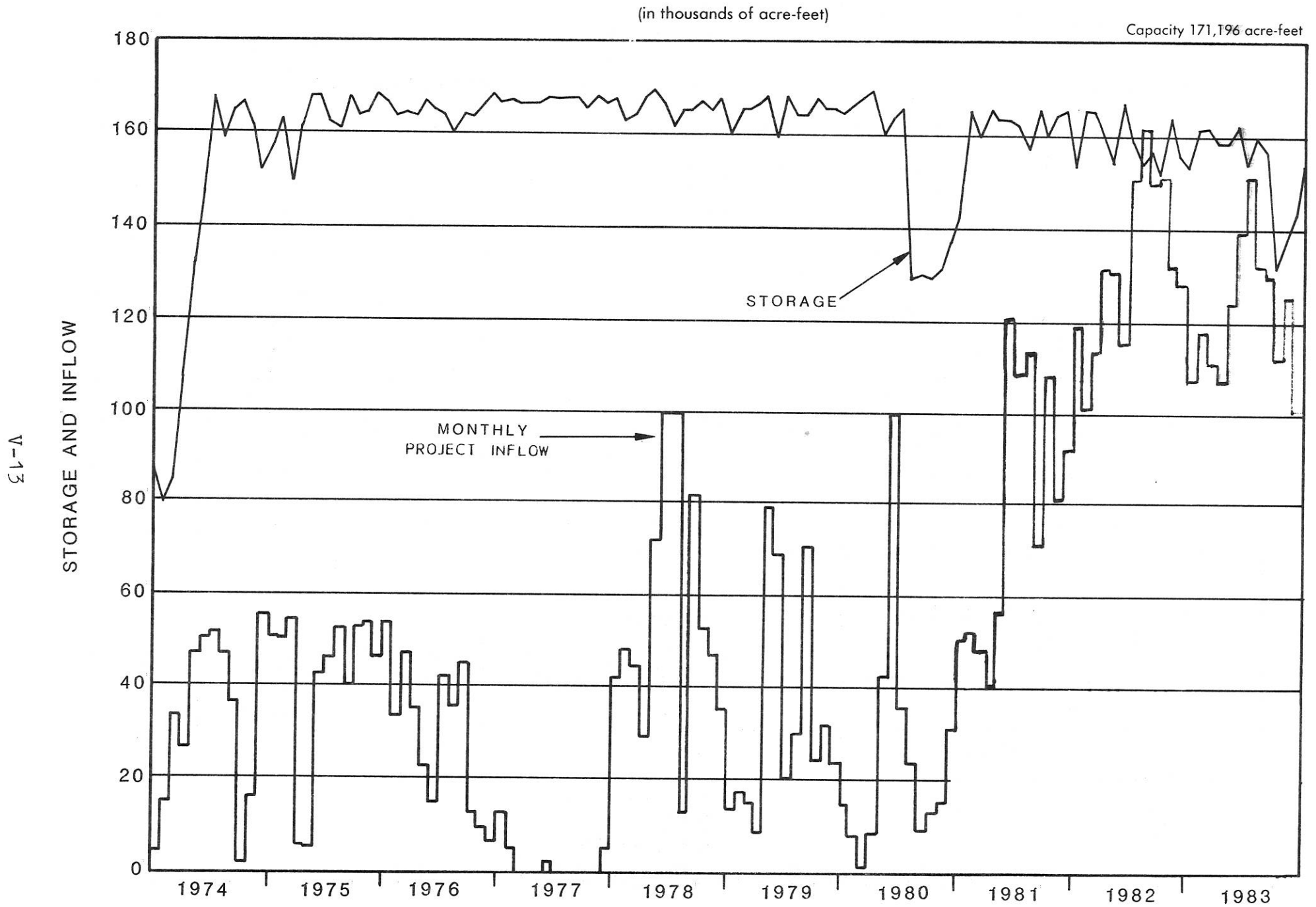


TABLE 15: ELDERBERRY FOREBAY MONTHLY OPERATION
MONTHLY OPERATION
1983

(in acre-feet except as noted)

MONTH	WATER SURFACE ELEVATION* (in feet)	TOTAL STORAGE *	STORAGE CHANGE	INFLOW		OUTFLOW			COMPUTED LOSSES (-) GAINS (+)
				CASTAIC P.P. GENERATION	NATURAL	TO CASTAIC LAKE		PUMP- BACK TO PYRAMID LAKE 1/ _	
						NATURAL	PROJECT		
JAN	1,525.9	26,379	-4,289	100,462	1,965	1,965	6,365	98,508	122
FEB	1,535.0	30,573	4,194	117,925	2,607	2,607	9,848	106,201	2,318
MAR	1,537.8	31,923	1,350	124,976 ^{2/}	20,585	35,227 ^{3/}	0	99,138	-9,846
APR	1,534.6	30,382	-1,541	106,656	3,763	3,763	2,276	107,021	1,100
MAY	1,525.8	26,335	-4,047	115,218	2,670	2,670	2,467	118,833	2,035
JUN	1,534.7	30,430	4,095	141,235	889	889	18,093	121,611	2,564
JUL	1,524.2	25,632	-4,798	138,404	281	281	16,043	129,971	2,812
AUG	1,536.2	31,148	5,516	132,511	229	0	0	133,605	6,381
SEP	1,539.0	32,511	1,363	145,168	97	97	21,921	128,741	6,857
OCT	1,524.4	25,719	-6,792	105,187	587	587	1,660	112,203	1,884
NOV	1,531.2	28,785	-3,066	116,678	496	496	5,020	112,912	-1,812
DEC	(1,238) 1,533.6	29,908	1,123	87,409	1,238	0	0	90,360	2,836
TOTAL			-760	1,431,049 ^{2/}	35,407	48,582	83,693	1,359,104	24,163

*At end of month.

1/ Pumpback by Los Angeles Department of Water and Power (LADWP) through Castaic Powerplant.

2/ Of this amount, 14,462 ac-ft is natural inflow to Pyramid Lake passed thru to Castaic Lake.

3/ Includes the amount shown in footnote 2/.

TABLE 16: CASTAIC LAKE
MONTHLY OPERATION
1983

(in acre-feet except as noted)

MONTH	WATER SURFACE ELEVATION (in feet)	TOTAL STORAGE 1/	STORAGE CHANGE	INFLOW			OUTFLOW		DISPOSITION OF NATURAL INFLOW		COMPUTED LOSSES (-) GAINS (+)
				NATURAL	FROM ELDERBERRY FOREBAY		DELIVERIES	RELEASED TO CASTAIC AFTERBAY	RELEASED FROM CASTAIC AFTERBAY		
					NATURAL	PROJECT			RELEASED FROM CASTAIC AFTERBAY		
									SURFACE	SUB- SURFACE	
JAN	1,511.47	(6,691) 315,865	2,988	3,630	1,965	6,365	10,880	394	178	190	2,302
FEB	1,513.44	(14,472) 320,223 3/	4,358	5,305	2,607	9,848	14,358	0	0	0	956
MAR	1,513.27	(28,034) 319,846 3/	-377	31,896	35,227 ^{2/}	0	25,133	53,612 ^{2/}	53,378	184	11,245
APR	1,514.27	(3,272) 322,070 3/	2,224	6,494	3,763	2,276	2,229	7,061	6,804	181	-1,019
MAY	1,510.40	(4,974) 313,513 3/	-8,557	4,944	2,670	2,467	15,448	2,612	2,456	184	-578
JUN	1,502.98	(2,494) 297,485 3/	-16,028	1,742	889	18,093	39,998	0	0	137	3,246
JUL	1,501.25	(700) 293,818 3/	-3,667	606	281	16,043	22,454	346	0	187	2,203
AUG	1,491.11	(296) 272,867 3/	-20,951	495	0	0	21,159	478	0	199	191
SEP	1,496.02	(295) 282,898 3/	10,031	330	97	21,921	13,969	112	0	132	1,764
OCT	1,493.13	(1,126) 276,968 (1,595)	-5,930	677	587	1,660	8,874	122	0	138	142
NOV	1,492.71	276,112	-856	776	496	5,020	6,776	803	235	131	431
DEC	1,490.05	(2,187) 270,730	-5,382	2,369	0	0	5,486	2,281	2,080	134	16
TOTAL			-42,147	59,264	48,582	83,693	186,764	67,820	65,131	1,927	20,898

*At end of month.

2/ 14,462 transferred from Pyramid Lake.

3/ The SWP acquired title to this natural inflow. These amounts are included in total storage. Total 1983 = 40,065 ac-ft.

FIGURE J: CASTAIC LAKE OPERATION

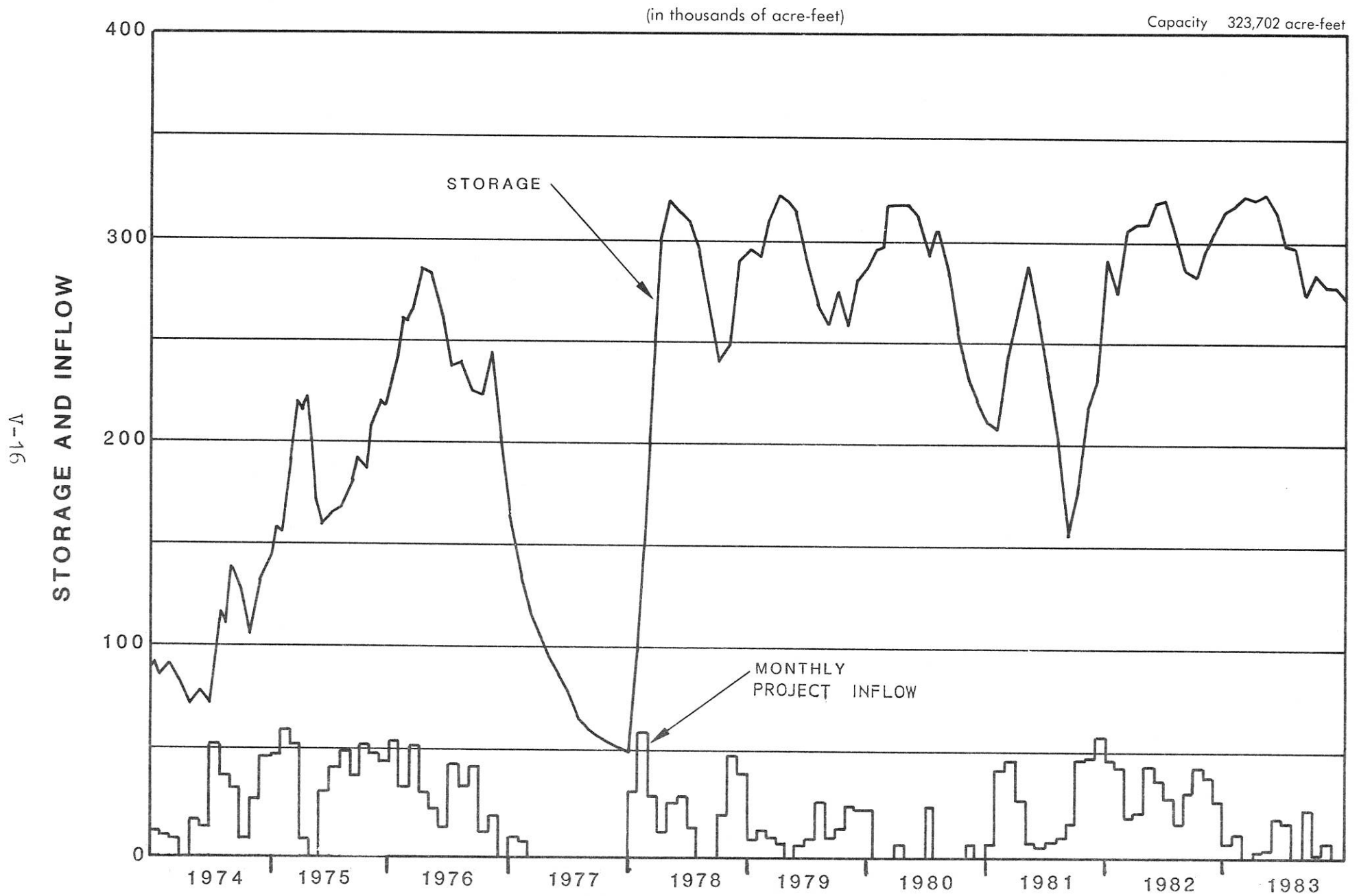


TABLE 17: SILVERWOOD LAKE
MONTHLY OPERATION
1983
(in acre-feet except as noted)

MONTH	WATER SURFACE * ELEVATION (in feet)	STORAGE * 1/	STORAGE CHANGE	INFLOW		OUTFLOW			COMPUTED LOSSES (-) GAINS (+)	EXCHANGE OF NATURAL INFLOW 2/
				NATURAL	PROJECT	SAN BERNARDINO TUNNEL	AT TURNOUT (CLAWA)	NATURAL INFLOW TO MOJAVE RIVER 3/		
JAN	3,350.54	(1,667) 70,686	1,541	4,683	21,481	22,005	100	3,161	643	3,841
FEB	3,344.94	(5,352) 65,500	-5,186	8,115	28,839	26,043	67	20,109	4,079	4,430
MAR	3,354.86	(2,088) 74,833	9,333	23,578	64,079	30,313	60	43,814	-4,137	26,842
APR	3,350.66	(3,830) 70,799	-4,034	7,384	13,105	20,771	57	4,732	1,037	5,642
MAY	3,342.88	4/(3,481AF) 63,646	-7,153	5,234	26,257	34,222	57	4,580	215	5,583
JUN	3,350.70	(3,592) 70,932	7,286	1,676	34,630	30,093	111	530	1,714	1,565
JUL	3,346.38	(3,265) 66,813	-4,119	598	18,990	23,919	218	16	446	925
AUG	3,323.42	(2,632) 47,517	-19,296	429	4,641	23,123	41	14	-188	1,062
SEP	3,294.18	(2,057) 27,924	-19,593	471	2,539	22,417	112	30	-44	1,046
OCT	3,293.92	(1,500) 27,713	-151	985	5,196	6,128	69	464	329	1,542
NOV	3,293.86	(1,265) 27,739	-34	864	6,004	7,325	49	12	484	1,099
DEC	3,308.92	(1,227) 37,110	9,371	3,112	15,285	8,032	72	2,162	1,240	3,150
TOTAL			32,035	57,129	241,046	255,391	1,013	79,624	5,818	56,727

*At end of month.

1/ Natural inflow storage shares shown in brackets.

2/ Total releases made from Mojave Siphon to Las Flores Ranch Co., in exchange for natural inflow stored in lake, and from Silverwood Lake to Mojave River from outlet works for Mojave W. A. The difference between this total column and the natural inflow released to Mojave River equals the Las Flores Ranch exchange.

3/ Kern River Intertie water for February is 16,401 ac-ft and March is 17,955 ac-ft.

4/ 185 ac-ft correction delivered to Mojave.

FIGURE K: SILVERWOOD LAKE OPERATION

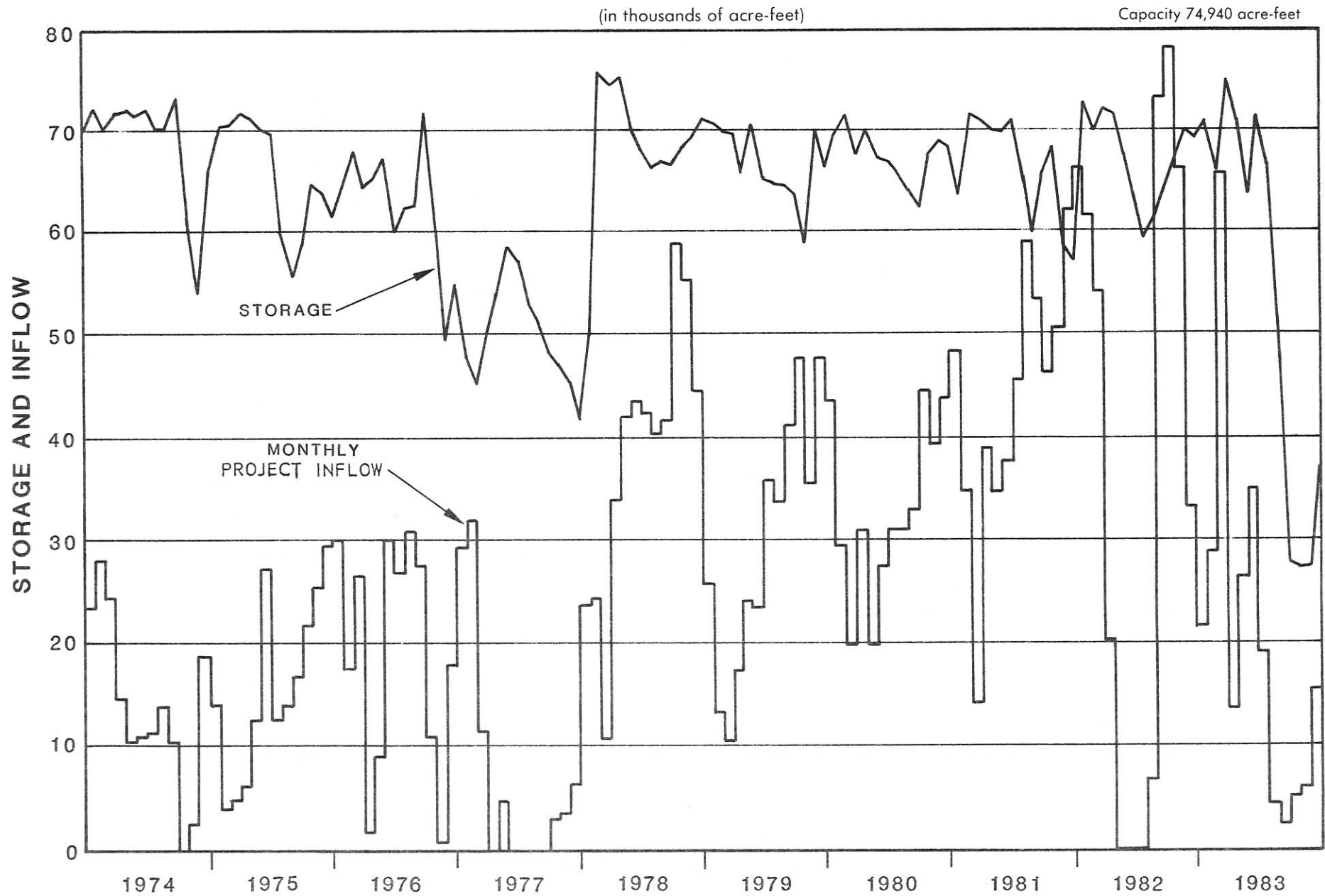


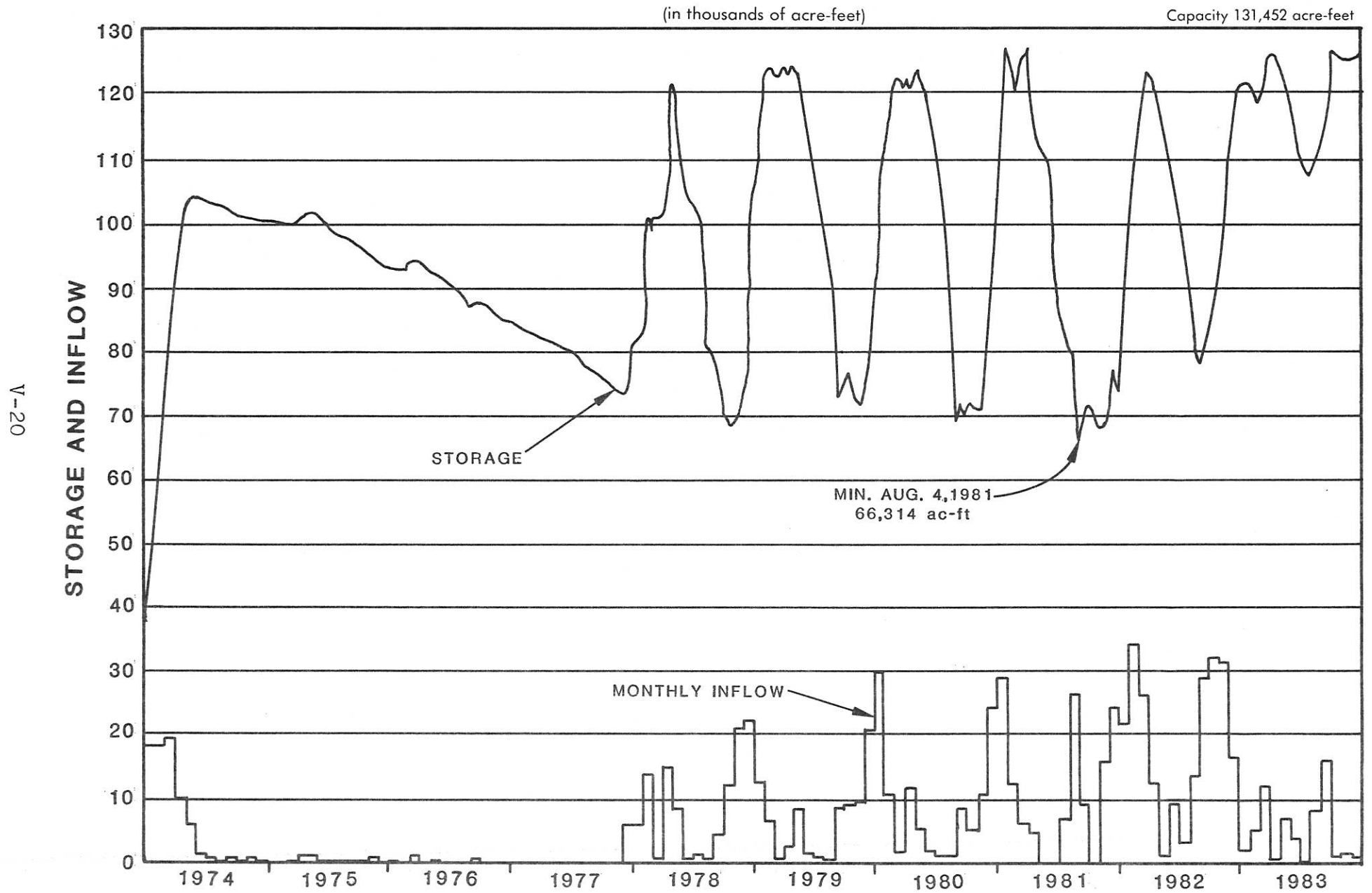
TABLE 18: LAKE PERRIS
MONTHLY OPERATION
1983

(in acre-feet except as noted)

MONTH	WATER SURFACE ELEVATION* (in feet)	TOTAL STORAGE*	STORAGE CHANGE	INFLOW	OUTFLOW	COMPUTED LOSSES (-) GAINS (+)
JAN	1,585.47	121,092	450	1,191	327	-414
FEB	1,584.40	118,692	-2,400	4,972	6,889	-483
MAR	1,587.83	126,452	7,760	12,089	4,430	101
APR	1,587.54	125,789	-663	550	660	-553
MAY	1,584.30	118,468	-7,321	6,879	12,015	-2,185
JUN	1,581.22	111,665	-6,803	3,831	10,341	-293
JUL	1,579.90	108,793	-2,872	313	1,957	-1,228
AUG	1,581.34	111,927	3,134	7,877	3,994	-749
SEP	1,587.66	126,063	14,136	15,590	541	-913
OCT	1,587.32	125,287	-776	840	494	-1,122
NOV	1,587.12	124,829	-458	1,016	451	-1,023
DEC	1,587.26	125,149	320	713	465	72
TOTAL			4,507	55,862	42,651	-8,704

*At end of month.

FIGURE L: LAKE PERRIS OPERATION



ENERGY OPERATIONS

SECTION VI

FIGURE M: PROJECT GROSS POWER GENERATION
1983

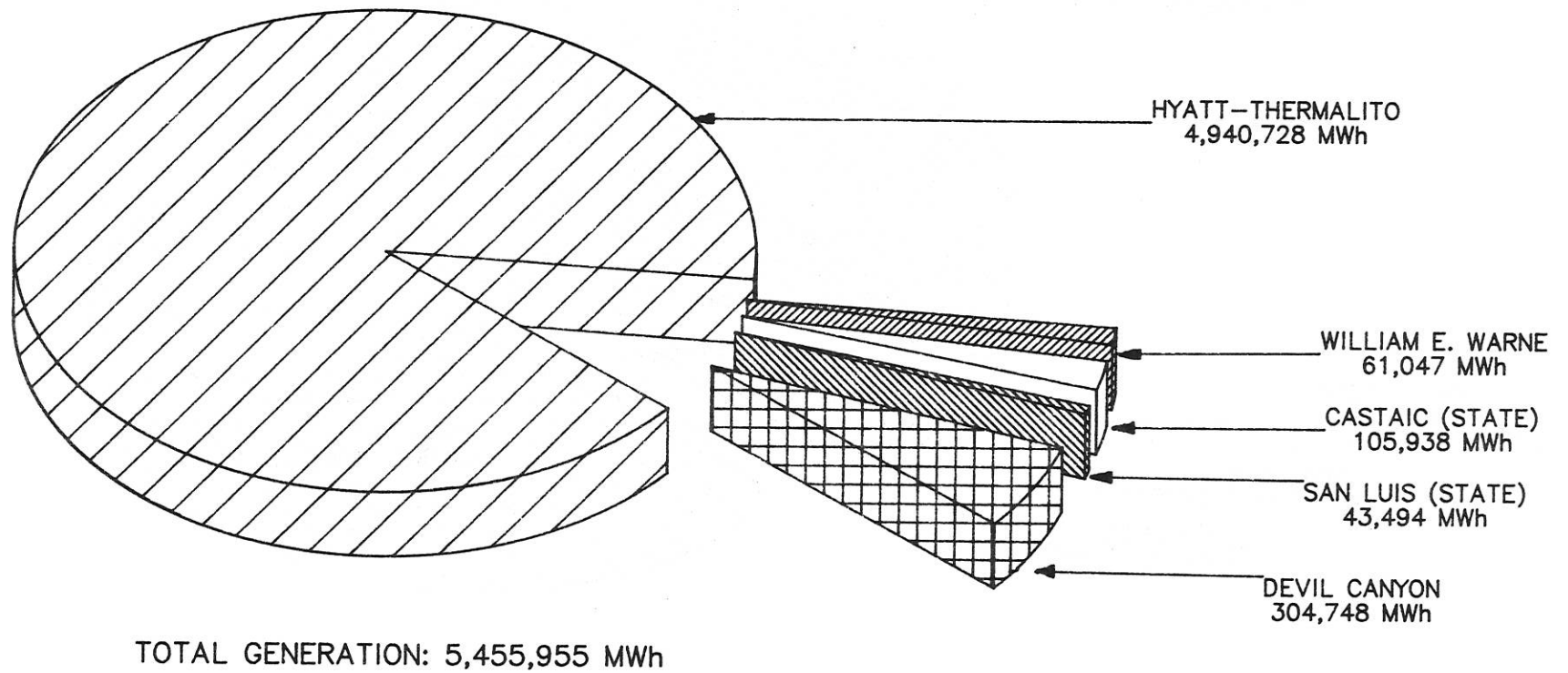


FIGURE N: ENERGY SOURCES
(STATE ONLY)
1983

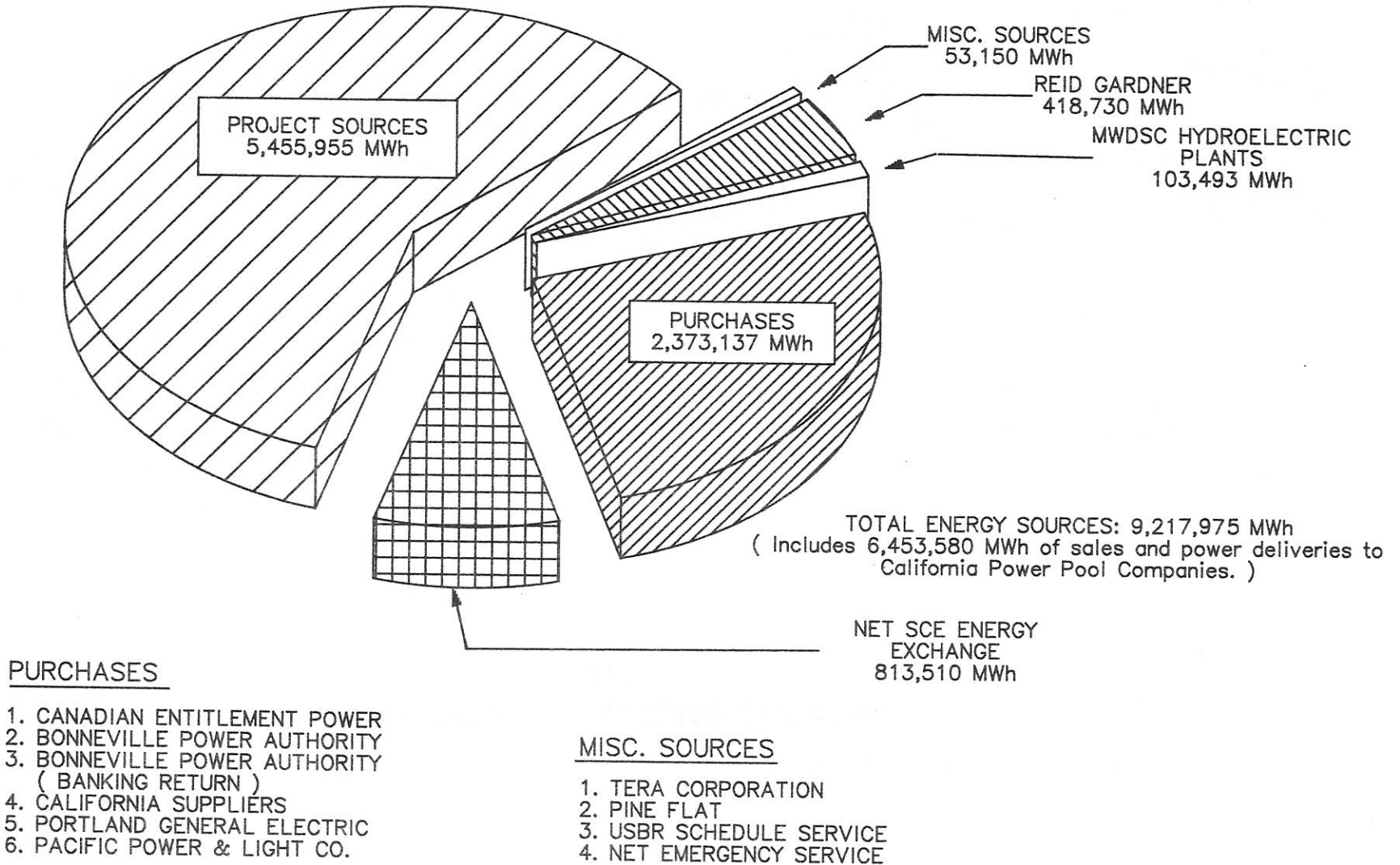
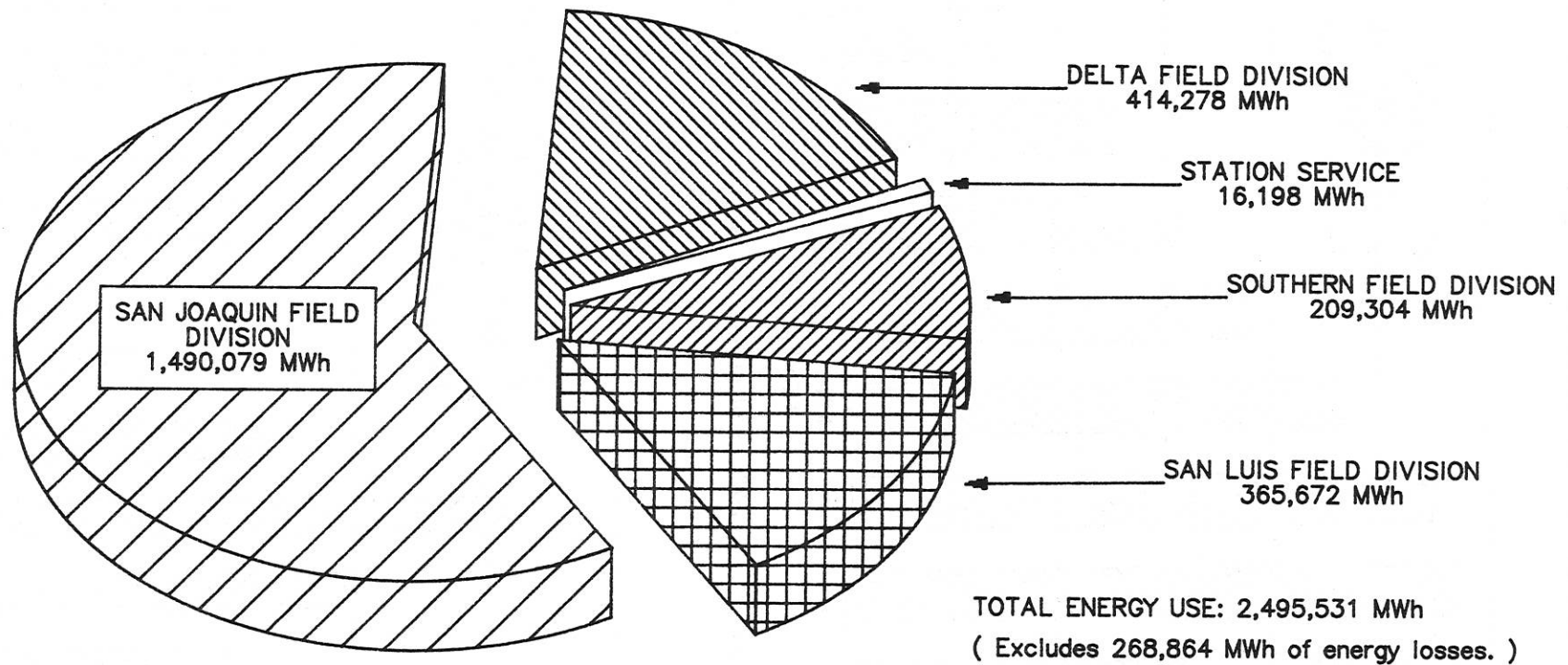


FIGURE 0: ENERGY USE BY FIELD DIVISION
(STATE ONLY)
1983



PUMPING PLANTS

DELTA FIELD DIVISION

1. CORDELIA
2. DELTA
3. SOUTH BAY
4. DEL VALLE

SAN LUIS FIELD DIVISION

1. SAN LUIS
2. DOS AMIGOS

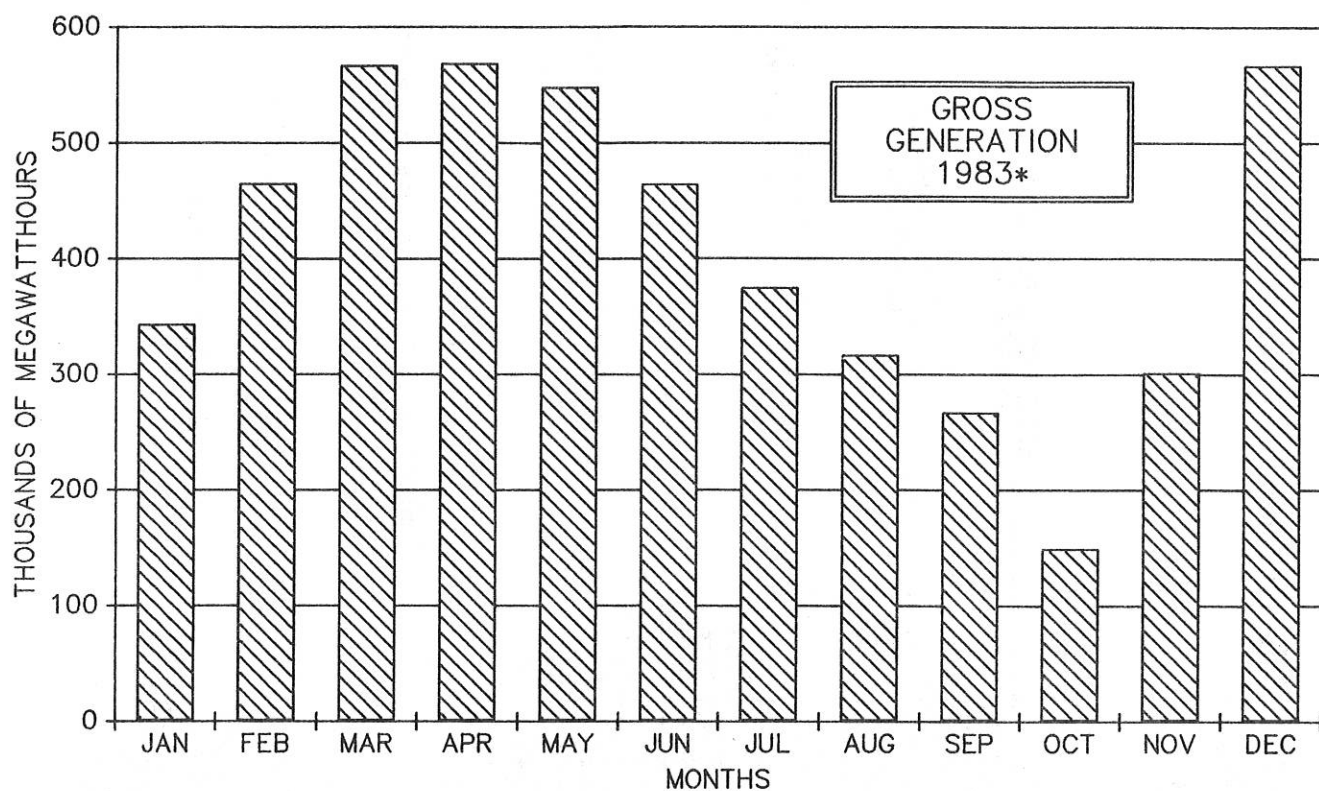
SAN JOAQUIN FIELD DIVISION

1. LAS PERILLAS
2. BADGER HILL
3. BUENA VISTA
4. WHEELER RIDGE
5. WIND GAP
6. A.D. EDMONSTON

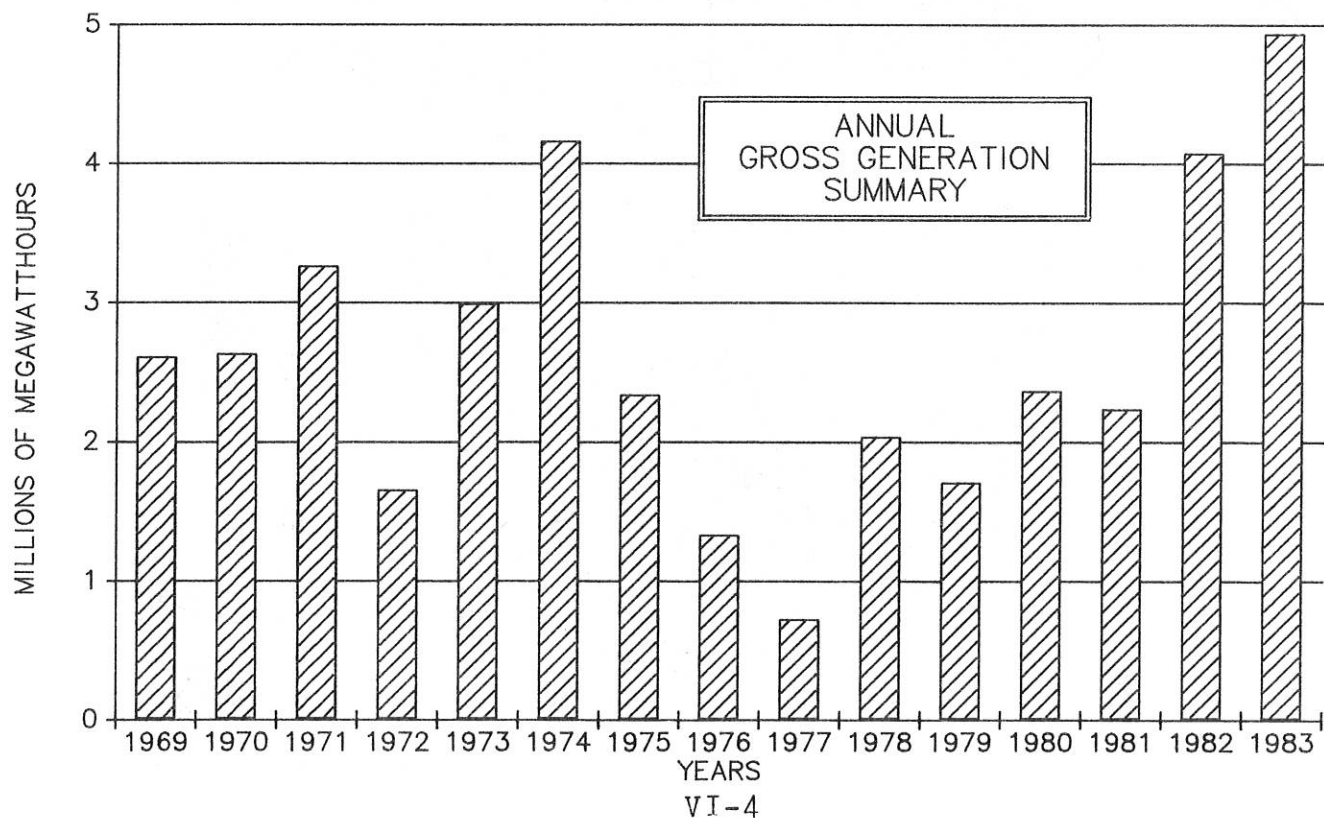
SOUTHERN FIELD DIVISION

1. OSO
2. PEARBLOSSOM

FIGURE P: OPERATION OF EDWARD HYATT AND THERMALITO POWERPLANTS



* Includes 14,900 MWh of plant use and pumpback requirements.



**TABLE 19: PROJECT POWER SOURCES
1983**

(in megawatthours)

SOURCE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Hyatt-Thermalto Powerplant <u>1/</u>	344,020	465,550	567,570	569,170	548,634	465,072	375,690	317,518	267,764	149,993	302,048	567,699	4,940,728
San Luis Generation-													
State	0	0	41	341	682	10,940	10,320	11,710	8,020	0	1,070	370	43,494
Federal	0	0	0	0	0	6,143	29,115	21,560	2,493	0	11,490	25,471	96,272
Total	0	0	41	341	682	17,083	39,435	33,270	10,513	0	12,560	25,841	139,766
William E. Warne Powerplant	5,146	7,486	5,884	0	3,027	9,860	12,832	717	1,692	50	8,086	6,267	61,047
Castaic Powerplant- State	5,280	12,504	20,155	1,207	3,936	14,928	21,216	0	17,976	3,528	5,208	0	105,938
Devil Canyon Powerplant	26,563	31,310	36,112	25,417	40,497	35,876	29,464	28,817	26,204	6,736	8,359	9,393	304,748
Purchases <u>2/</u>	305,136 ^{3/}	357,728 ^{3/}	298,092 ^{3/}	108,450	107,194	147,173	184,147	174,803	182,064	181,350	163,100	163,900	2,373,137
Miscellaneous Sources <u>2/</u>	0	10	20	360	540	9,580	8,460	4,040	630	310	13,320	15,880	53,150
MWDSC Hydroelectric Plants	0	0	0	12,845	14,923	16,343	16,197	13,573	8,500	6,712	6,627	7,764	103,493
Net Gain, SCE Power Exchange	0	0	0	22,870	12,010	8,160	80,140	65,500	55,250	223,980	169,960	175,640	813,510
Reid Gardner Powerplant	0	0	0	0	0	0	57,490	96,660	52,400	27,910	98,890	85,380	418,730

End of "Suppliers Contract", March 31, 1983. \longleftrightarrow DWR begins bulk power agency operation, April 1, 1983.

1/ These figures show metered values and do not reflect losses.

2/ See Figure N for members of these source groups.

3/ Canadian Entitlement, California Suppliers, and Bonneville Power Authority only.

Total State-	9,217,975
Total Federal-	96,272
Total Project-	9,314,247

TABLE 20: PROJECT POWER USES

1983

(in megawatthours) ^{1/}

PUMPING PLANTS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Hyatt-Thermalto (Pumpback and Station Service)	1,150	30	0	0	10	120	180	0	330	360	12,720	0	14,900
Cordella	53	41	29	33	47	121	146	143	120	286	118	47	1,184
Banks State	113,211	104,299	25,095	2,517	2,870	12,844	21,212	33,967	12,277	6,567	13,687	8,287	356,833
Federal	0	37	0	0	4,708	19,460	0	16,113	0	0	0	112	40,430
South Bay	1,713	1,395	865	1,620	5,034	8,639	10,385	10,635	7,262	4,099	2,756	1,783	56,186
Del valle	10	8	8	5	5	5	5	5	5	5	7	7	75
San Luis State	94,609	109,967	28,759	-27	2,817	23,061	20,655	23,672	9,060	925	11,709	351	325,558
Federal	43,151	59,495	90,773	69,269	14,735	12,126	2,915	9,527	50,705	29,795	0	0	382,491
Dos Amigos State	1,333	123	166	1,025	119	1,966	7,653	12,458	5,698	2,452	3,503	3,618	40,114
Federal	8,429	3,313	751	8,889	15,037	24,811	27,568	31,692	8,355	5,453	13,500	25,547	173,345
Las Perillas	171	85	152	644	1,049	1,439	1,491	1,027	455	307	299	557	7,676
Badger Hill	415	184	360	1,761	2,855	3,951	4,112	2,765	1,209	807	788	1,540	20,747
Buena Vista	9,654	13,349	19,354	6,614	13,085	21,753	20,361	10,444	5,429	3,478	6,465	9,763	139,749
Wheeler Ridge	9,609	13,905	21,392	6,291	12,779	20,270	17,287	6,268	4,750	3,354	7,053	10,015	132,973
Wind Gap	21,001	30,989	48,141	11,943	24,617	40,812	34,330	11,316	9,020	6,051	14,041	20,947	274,208
A. D. Edmunston	72,214	107,506	169,222	38,851	82,817	135,441	110,482	32,068	27,483	18,246	48,414	71,982	914,726
Oso	2,737	3,389	3,052	397	1,342	4,510	5,611	1,052	853	187	3,509	3,866	30,505
Pearblossom	15,299	23,716	43,589	9,654	18,126	24,951	14,618	3,901	2,706	4,483	5,493	12,263	178,799
Devil Canyon Station Service	16	14	40	1	1	0	1	0	0	1	2	27	103
William E. Warne Station Service	78	67	81	111	88	58	69	143	132	135	104	129	1,195

End of "Suppliers Contract", March 31, 1983. ← → DWR begins bulk power agency operation, April 1, 1983.

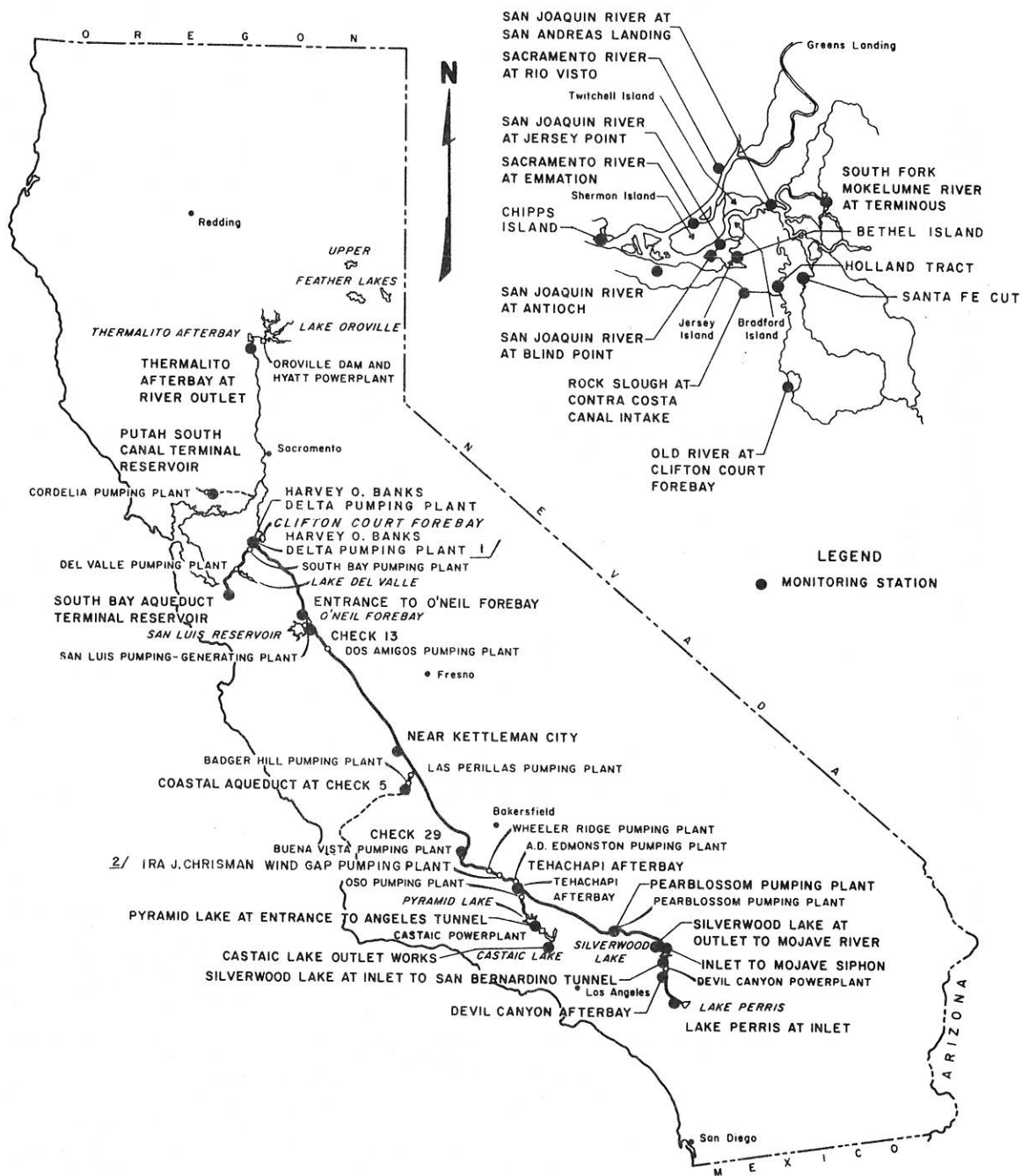
^{1/} Values rounded to nearest megawatthour.

Total State- 2,495,531
 Total Federal- 596,266
 Total Project- 3,091,797

WATER QUALITY

SECTION VII

MAP 4 WATER QUALITY MONITORING STATIONS



1/ This title became effective on June 3, 1981.

2/ This title became effective on Jan. 9, 1986.

FIGURE Q: MEAN DAILY CHLORIDE LEVELS AT DELTA STATIONS

1983

VII-2

CHLORIDES
(in milligrams per liter)

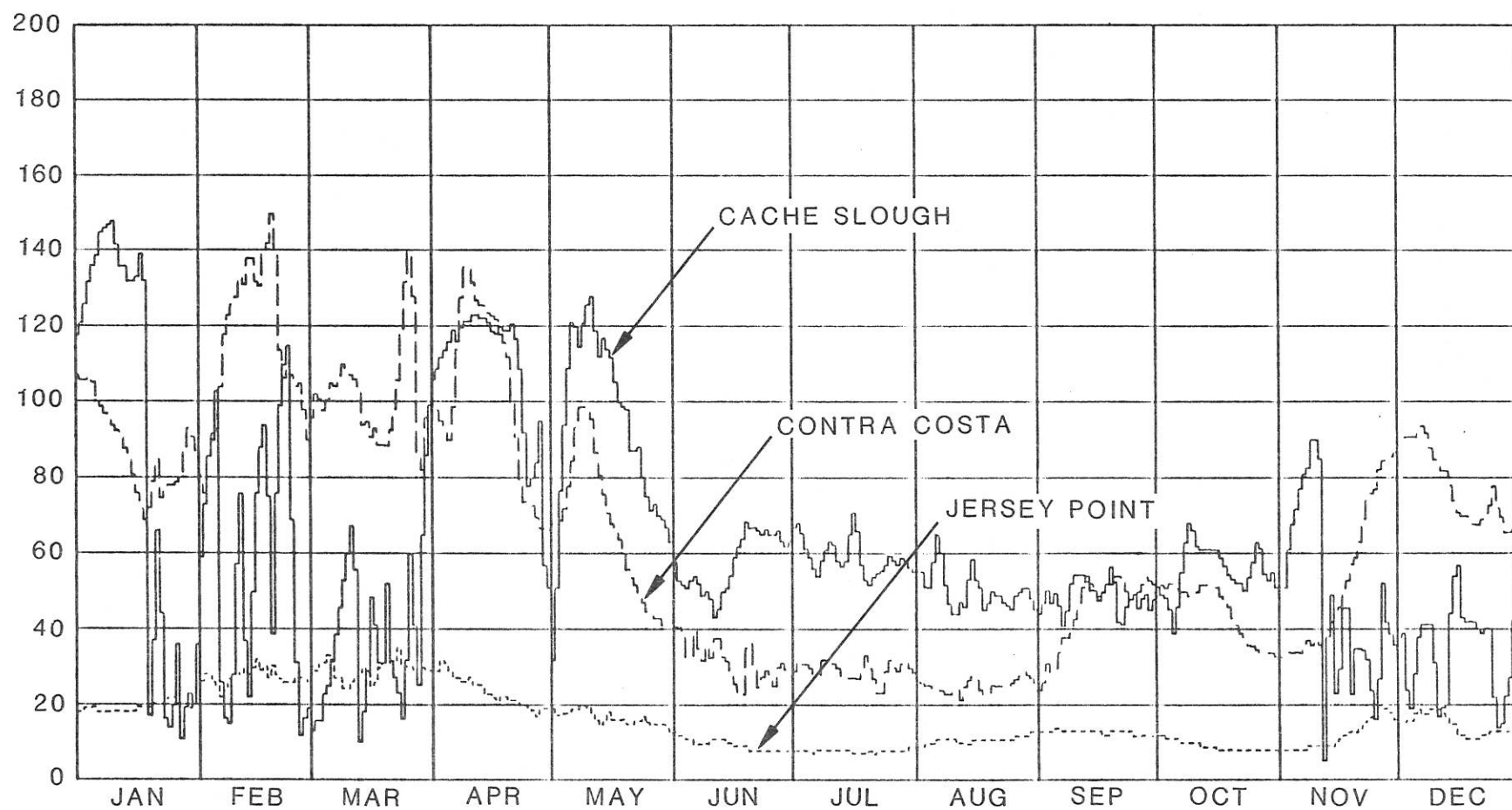


FIGURE R: MEAN DAILY ELECTRICAL CONDUCTIVITY AT SWP LOCATIONS

1983

Σ-11A

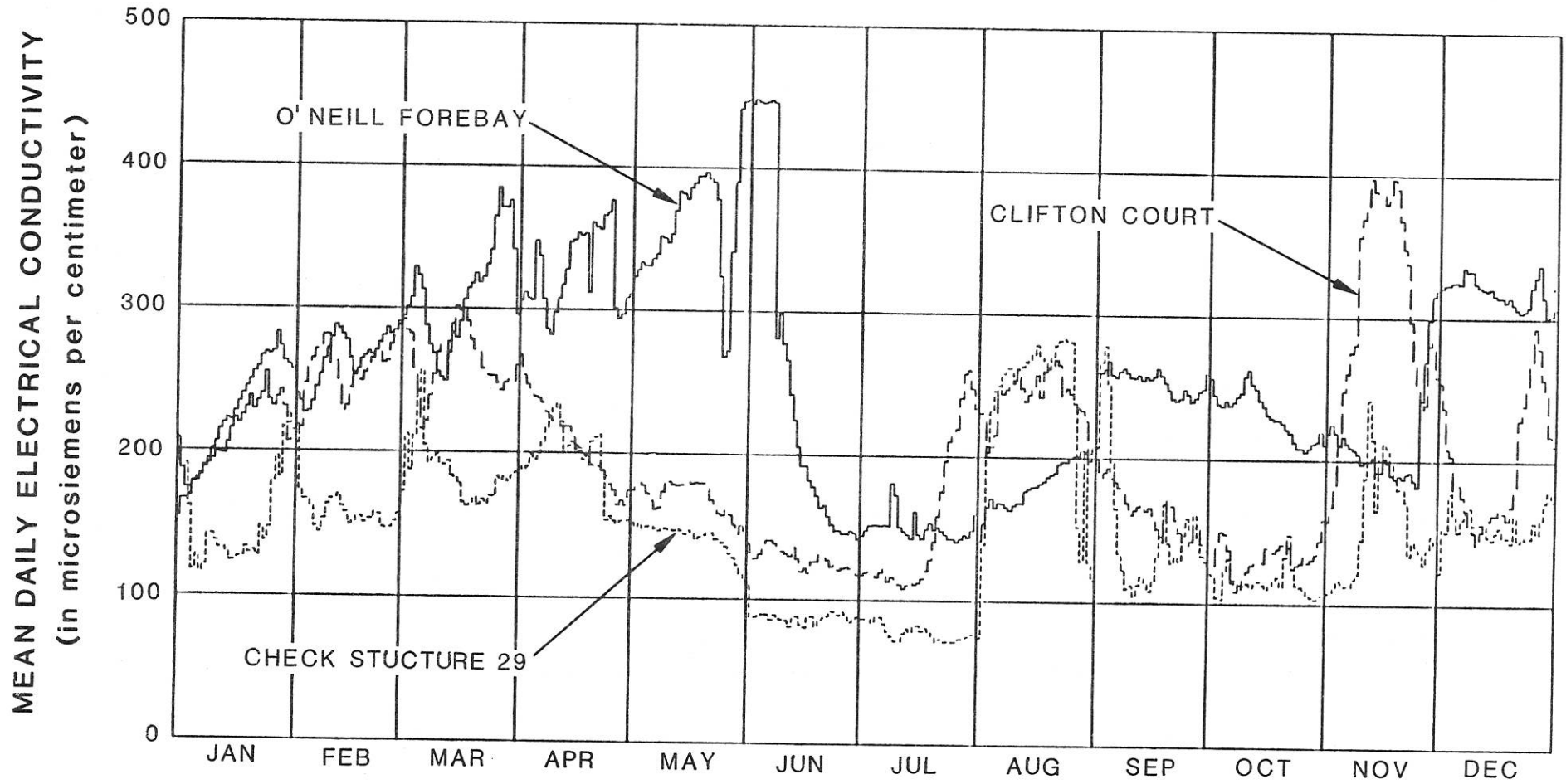


TABLE 21: THERMALITO AFTERBAY AT FEATHER RIVER OUTLET

1983

Constituents*	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL Average
Total Dissolved Solids	49	48	51	54	55	53	54	53	43	50	47	63	52
Total Hardness	30	30	30	30	30	30	30	30	30	30	30	32	30
Chlorides	1	1	1	1	1	1	1	1	1	1	1	1	1
Sulfates	1	2	2	1	1	1	1	1	1	2	1	2	1
Sodium	3	3	3	3	3	3	3	3	3	3	3	3	3
% Sodium(%)	17	17	17	17	17	17	17	17	17	18	17	17	17
Specific Conductance	75	73	72	71	77	68	65	71	73	71	73	80	72
pH(moles/l)	7.5	7.1	7.2	7.2	7.3	7.3	7.2	7.3	7.2	7.4	7.3	7.3	7.3
Boron	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fluoride													0.0
Lead													0.00
Selenium													0.00
Hexavalent Chromium													0.00
Arsenic													0.00
Iron													0.00
Manganese													0.00
Magnesium	3	3	3	3	3	3	3	3	3	3	3	3	3
Copper													0.00
Calcium	7	7	7	7	7	7	7	7	7	7	7	8	7
Zinc													0.00
Phenol													0.000
Color(units)													0
Sampling Date	01/19	02/16	03/16	04/20	05/18	06/15	07/20	08/17	09/21	10/19	11/16	12/21	

* Specific Conductance is in microsiemens/cm (microsiemens are equivalent to micromhos; to obtain millisiemens, divide by 1000). All other constituents are in milligrams per liter except pH, % Sodium, and as otherwise noted. Each value is obtained from a once-monthly sample.

**TABLE 22: PUTAH SOUTH CANAL FACILITY
(INFLOW TO NORTH BAY AQUEDUCT)**

1983

Constituents*	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL Average
Total Dissolved Solids	229	178	173	189	191	181	180	174	164	171	168	192	183
Total Hardness	171	132	123	149	140	144	141	139	139	139	133	144	141
Chlorides	12	8	9	8	6	5	5	5	5	8	6	6	7
Sulfates	36	23	21	26	25	24	21	21	20	21	24	28	24
Sodium	19	13	13	14	12	11	10	9	9	10	11	11	12
% Sodium(%)	19	17	18	17	16	14	13	12	12	14	15	14	15
Specific Conductance	408	305	299	335	331	307	302	299	300	299	300	321	317
pH(moles/l)	8.4	8.1	8.0	8.5	8.4	8.3	8.4	8.6	8.3	8.9	8.1	7.9	8.4
Boron	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.2
Fluoride													0.0
Lead													0.00
Selenium													0.00
Hexavalent Chromium													0.00
Arsenic													0.00
Iron													0.00
Manganese													0.00
Magnesium	27	21	19	24	23	24	24	24	24	24	22	24	23
Copper													0.00
Calcium	24	18	18	20	18	18	17	16	16	16	17	18	18
Zinc													0.00
Phenol													0.000
Color(units)													0
Sampling Date	01/18	02/15	03/15	04/19	05/17	06/14	07/19	08/16	09/20	10/18	11/15	12/20	

* Specific Conductance is in microsiemens/cm (microsiemens are equivalent to micromhos; to obtain millisiemens, divide by 1000). All other constituents are in milligrams per liter except pH, % Sodium, and as otherwise noted. Each value is obtained from a once-monthly sample.

TABLE 23: CALIFORNIA AQUEDUCT AT DELTA PUMPING PLANT

1983

Constituents*	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL Average
**Total Dissolved Solids	138	162	185	281	229	90	99	144	141	131	163	183	162
**Total Hardness	59	67	75	105	89	41	45	61	60	56	67	74	67
**Chlorides	23	30	37	70	51	12	14	25	24	21	30	36	31
**Sulfates	22	26	30	44	36	15	16	23	23	21	26	20	26
**Sodium	21	26	31	52	40	12	14	22	22	19	26	30	26
**% Sodium(%)	44	46	47	52	49	39	40	44	44	43	46	47	45
**Specific Conductance	229	272	314	484	391	143	160	240	234	215	273	310	272
Specific Conductance	269	269	287	350	423	154	138	241	206	203	268	274	257
pH(moles/l)	7.0	7.1	7.8	7.9	7.4	7.5	7.7	7.3	7.6	7.5	7.5	7.9	7.6
Boron	0.1	0.1	0.2	0.3	0.7	0.0	0.1	0.1	0.1	0.2	0.1	0.2	0.2
Fluoride	0.1	0.1	0.2	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.0	0.1	0.1
Lead	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
Selenium	0.01	0.02	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.01	0.00	0.01	0.01
Hexavalent Chromium		0.00							0.00			0.01	0.01
Arsenic	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Iron	0.05	0.02	0.04	0.01	0.02	0.02	0.00	0.01	0.02	0.20	0.03	0.03	0.04
Manganese	0.04	0.04	0.03	0.08	0.05	0.05	0.03	0.06	0.02	0.01	0.05	0.06	0.04
Magnesium	7	7	8	9	10	4	3	7	5	5	6	7	7
Copper	0.01	0.00	0.02	0.01	0.01	0.01	0.01	0.00	0.02	0.02	0.01	0.02	0.01
Calcium	14	15	16	18	18	9	8	12	11	10	14	14	13
Zinc	0.01	0.02	0.02	0.02	0.03	0.02	0.01	0.01	0.01	0.02	0.02	0.03	0.02
Phenol		0.000											
Color(units)	12	25	25	15	10	10	8	10	0.000	12	20	20	0.000
Sampling Date	01/19	02/16	03/16	04/20	05/18	06/15	07/20	08/17	09/21	10/19	11/16	12/21	15

* Specific Conductance is in microsiemens/cm (microsiemens are equivalent to micromhos; to obtain millisiemens, divide by 1000). All other constituents are in milligrams per liter except pH, % Sodium, and as otherwise noted. Each value is obtained from a once-monthly sample.

** Values correlated from continuous EC.

TABLE 24: SOUTH BAY AQUEDUCT TERMINAL RESERVOIR

1983

Constituents*	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL Average
**Total Dissolved Solids	163	159	162	196	188	109	98	131	159	180	202	214	163
**Total Hardness	77	75	76	90	87	54	49	63	75	83	92	96	77
**Chlorides	24	23	24	37	34	4	0	12	23	31	39	43	24
**Sulfates	26	26	26	31	30	18	16	21	26	29	32	34	26
**Sodium	22	21	22	30	28	10	7	15	22	25	31	34	22
*** Sodium(%)	39	38	39	42	41	29	25	34	38	41	43	43	38
**Specific Conductance	276	267	273	337	323	175	155	216	269	307	348	369	276
Specific Conductance pH(moles/l)	324	300	279	441	409	317	140	244	317	343	367	406	324
	7.8	7.9	7.8	8.2	8.3	7.6	7.6	7.6	8.1	8.4	8.2	7.9	8.0
Boron	0.1	0.2	0.1	0.4	0.2	0.0	0.1	0.2	0.1	0.2	0.1	0.2	0.2
Fluoride	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1
Lead	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Selenium	0.01	0.02	0.00	0.00	0.00	0.01	0.01	0.02	0.00	0.01	0.01	0.01	0.01
Hexavalent Chromium		0.00							0.00				0.00
Arsenic	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Iron	0.03	0.01	0.02	0.01	0.01	0.02	0.00	0.01	0.01	0.01	0.13	0.01	0.02
Manganese	0.00	0.00	0.03	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.03	0.02	0.01
Magnesium	15	12	14	15	18	15	4	7	14	16	18	20	14
Copper	0.01	0.01	0.01	0.00	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.00	0.01
Calcium	27	22	26	28	32	27	9	12	26	26	28	32	25
Zinc	0.01	0.01	0.03	0.00	0.01	0.03	0.00	0.01	0.00	0.01	0.01	0.00	0.01
Phenol		0.000							0.001				0.001
Color(units)	10	18	20	12	8	8	8	8	15	8	10	25	13
Sampling Date	01/18	02/15	03/15	04/19	05/17	06/14	07/19	08/16	09/20	10/18	11/15	12/20	

* Specific Conductance is in microsiemens/cm (microsiemens are equivalent to micromhos; to obtain millisiemens, divide by 1000). All other constituents are in milligrams per liter except pH, % Sodium, and as otherwise noted. Each value is obtained from a once-monthly sample.

** Values correlated from continuous EC.

TABLE 25: CALIFORNIA AQUEDUCT ENTRANCE TO O'NEILL FOREBAY

1983

VIII-8	Constituents*	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL Average
	** Total Dissolved Solids	137	158	184	181	213	149	92	138	151	139	129	188	155
	** Total Hardness	59	66	75	74	84	64	44	60	64	60	57	76	65
	** Chlorides	23	28	36	35	45	26	12	23	27	23	21	37	28
	** Sulfates	22	25	29	29	34	24	15	22	24	22	21	30	25
	** Sodium	21	25	30	30	36	23	12	21	23	21	19	31	24
	** % Sodium(%)	43	45	47	46	48	44	39	43	44	43	42	47	44
	** Specific Conductance	229	266	313	307	365	250	151	231	255	232	216	319	261
	Specific Conductance	256	259	291	262	400	193	151	239	246	235	213	309	255
	pH(moles/l)	7.2	7.5	7.6	8.9	8.3	7.4	8.7	7.5	7.6	8.8	8.3	8.0	8.3
	Boron	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2
	Fluoride	0.1	0.1	0.2	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.0	0.1	0.1
	Lead	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Selenium	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.01	0.01	0.01
	Hexavalent Chromium		0.00							0.00				0.00
	Arsenic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Iron	0.08	0.02	0.02	0.01	0.01	0.00	0.02	0.02	0.01	0.01	0.01	0.03	0.02
	Manganese	0.02	0.03	0.01	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.02	0.01
	Magnesium	6	7	8	7	12	5	4	6	6	6	5	8	7
	Copper	0.02	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01
	Calcium	14	15	18	16	26	11	9	12	13	12	11	16	14
	Zinc	0.03	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.00	0.00	0.02	0.02	0.01
	Phenol		0.000							0.001				0.001
	Color(units)	12	25	25	15	8	8	8	8	15	10	15	20	14
	Sampling Date	01/19	02/16	03/16	04/20	05/18	06/15	07/20	08/17	09/21	10/19	11/16	12/21	

* Specific Conductance is in microsiemens/cm (microsiemens are equivalent to micromhos; to obtain millisiemens, divide by 1000). All other constituents are in milligrams per liter except pH, % Sodium, and as otherwise noted. Each value is obtained from a once-monthly sample.

** Values correlated from continuous EC.

TABLE 26: CALIFORNIA AQUEDUCT AT CHECK 13

1983

Constituents*	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL Average
**Total Dissolved Solids	145	177	208	188	147	134	126	165	142	123	146	171	156
**Total Hardness	62	73	84	77	63	58	55	69	61	54	62	71	66
**Chlorides	26	35	45	39	26	23	21	32	25	20	26	33	29
**Sulfates	27	32	36	33	27	25	24	30	26	23	27	31	28
**Sodium	23	30	37	32	24	21	19	27	23	19	23	29	26
**% Sodium(%)	45	47	49	47	45	44	43	46	45	43	45	47	46
**Specific Conductance	245	304	359	323	249	227	212	282	241	207	248	292	266
Specific Conductance	247	316	340	284	245	240	187	274	220	194	240	278	255
pH(moles/l)	7.8	7.9	8.0	7.8	7.9	8.0	8.1	8.2	7.6	8.0	7.9	7.9	7.9
Boron	0.1	0.1	0.2	0.2	0.1	0.2	0.1	0.2	0.1	0.2	0.1	0.2	0.2
Fluoride	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.1	0.2	0.1
Lead	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Selenium	0.01	0.01	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.02	0.00	0.01	0.01
Hexavalent Chromium		0.00							0.00				0.00
Arsenic	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Iron	0.07	0.00	0.05	0.02	0.02	0.01	0.10	0.04	0.03	0.03	0.04	0.01	0.04
Manganese	0.02	0.01	0.01	0.00	0.01	0.00	0.02	0.00	0.01	0.02	0.02	0.02	0.01
Magnesium	6	8	9	7	7	6	5	7	6	5	6	7	7
Copper	0.01	0.00	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Calcium	13	18	19	16	14	13	11	15	12	10	13	15	14
Zinc	0.02	0.01	0.01	0.01	0.01	0.00	0.02	0.01	0.00	0.01	0.01	0.01	0.01
Phenol		0.001											
Color(units)	10	25	20	8	8	10	8	10	0.000	12	15	20	15
Sampling Date	01/19	02/16	03/16	04/20	05/18	06/15	07/20	08/17	09/21	10/19	11/16	12/21	13

* Specific Conductance is in microsiemens/cm (microsiemens are equivalent to micromhos; to obtain millisiemens, divide by 1000). All other constituents are in milligrams per liter except pH, % Sodium, and as otherwise noted. Each value is obtained from a once-monthly sample.

** Values correlated from continuous EC.

TABLE 27: CALIFORNIA AQUEDUCT NEAR KETTLEMAN CITY

1983

Constituents*	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL Average
**Total Dissolved Solids	144	377	400	478	125	112	124	165	167	139	122	168	210
**Total Hardness	61	141	149	174	53	48	53	68	69	59	52	69	83
**Chlorides	29	79	84	101	25	23	25	34	34	28	25	34	43
**Sulfates	24	74	79	98	20	17	20	28	28	23	19	28	38
**Sodium	23	70	75	91	20	17	20	27	28	23	19	28	37
**% Sodium(%)	46	52	52	53	45	44	45	47	47	45	45	47	47
**Specific Conductance	246	635	674	803	214	191	213	282	285	238	209	286	356
Specific Conductance	217	685	466	713	129	170	193	277	249	227	196	301	319
pH(moles/l)	7.5	8.5	8.5	8.6	7.7	8.2	7.6	7.6	8.2	7.8	7.4	7.7	8.1
Boron	0.1	0.3	0.3	0.4	0.9	0.1	0.1	0.2	0.1	0.2	0.1	0.2	0.3
Fluoride	0.1	0.3	0.3	0.3	0.2	0.2	0.1	0.2	0.1	0.1	0.0	0.1	0.2
Lead	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Selenium	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.01	0.01
Hexavalent Chromium		0.00							0.00				0.00
Arsenic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Iron	0.08	0.03	0.14	0.09	0.04	0.00	0.05	0.03	0.01	0.02	0.03	0.01	0.04
Manganese	0.01	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
Magnesium	5	21	15	23	3	4	5	7	6	6	5	8	9
Copper	0.00	0.02	0.02	0.01	0.02	0.01	0.01	0.02	0.01	0.02	0.01	0.02	0.01
Calcium	12	40	27	45	11	11	11	15	13	12	10	16	19
Zinc	0.00	0.01	0.00	0.01	0.02	0.01	0.01	0.02	0.00	0.02	0.02	0.03	0.01
Phenol		0.002							0.001				0.002
Color(units)	10	5	12	8	8	8	8	8	12	18	35	18	13
Sampling Date	01/19	02/16	03/15	04/20	05/18	06/14	07/20	08/17	09/21	10/19	11/15	12/21	

* Specific Conductance is in microsiemens/cm (microsiemens are equivalent to micromhos; to obtain millisiemens, divide by 1000). All other constituents are in milligrams per liter except pH, % Sodium, and as otherwise noted. Each value is obtained from a once-monthly sample.

** Values correlated from continuous EC.

TABLE 28: COASTAL BRANCH AT CHECK 5

1983

Constituents*	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL Average
**Total Dissolved Solids	130	208	430	265	94	77	109	170	172	145	138	183	177
**Total Hardness	52	81	151	100	38	30	44	67	68	59	55	72	68
**Chlorides	19	43	135	63	11	7	14	30	31	23	21	34	36
**Sulfates	24	36	64	43	18	14	20	30	30	26	25	32	30
**Sodium	18	35	89	48	11	8	14	27	27	22	20	30	29
**% Sodium(%)	43	49	56	51	40	37	41	46	47	45	44	47	46
**Specific Conductance	198	344	756	448	132	99	159	273	276	227	212	297	285
Specific Conductance	196	299	621	502	125	83	171	297	271	235	241	324	280
pH(moles/l)	7.5	7.8	7.6	7.9	6.6	7.6	7.5	7.7	7.7	7.8	8.5	7.5	7.8
Boron	0.1	0.1	0.4	0.3	0.1	0.0	0.1	0.2	0.2	0.2	0.2	0.2	0.2
Fluoride	0.1	0.1	0.5		0.2	0.1	0.1	0.1	0.2	0.1	0.0	0.1	0.1
Lead	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Selenium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hexavalent Chromium		0.00							0.00				0.00
Arsenic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Iron	0.08	0.09	0.02	0.02	0.05	0.13	0.09	0.12	0.06	0.10	0.10	0.05	0.08
Manganese	0.00	0.01	0.00	0.01	0.01	0.02	0.00	0.01	0.01	0.00	0.03	0.00	0.01
Magnesium	4	7	22	16	2	2	4	7	7	6	6	8	8
Copper	0.02	0.03	0.01	0.01	0.03	0.03	0.02	0.01	0.02	0.02	0.01	0.01	0.02
Calcium	12	18	33	30	12	8	13	17	14	11	13	13	17
Zinc	0.01	0.02	0.01	0.01	0.05	0.03	0.03	0.02	0.04	0.03	0.03	0.03	0.03
Phenol		0.001							0.003				0.002
Color(units)													0
Sampling Date	01/18	02/15	03/15	04/19	05/17	06/14	07/19	08/16	09/20	10/18	11/15	12/20	

* Specific Conductance is in microsiemens/cm (microsiemens are equivalent to micromhos; to obtain millisiemens, divide by 1000). All other constituents are in milligrams per liter except pH, % Sodium, and as otherwise noted. Each value is obtained from a once-monthly sample.

** Values correlated from continuous EC.

TABLE 29: CALIFORNIA AQUEDUCT AT CHECK 29

1983

Constituents*	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL Average
**Total Dissolved Solids	99	103	119	124	94	63	206	145	98	78	100	101	111
**Total Hardness	42	43	49	52	40	27	84	60	42	33	42	43	46
**Chlorides	11	11	15	16	10	4	45	21	10	7	11	11	14
**Sulfates	14	14	17	18	13	8	32	22	14	10	14	14	16
**Sodium	14	14	17	18	13	7	35	22	14	10	14	14	16
**% Sodium(%)	42	42	43	44	41	37	47	45	42	39	42	42	42
**Specific Conductance	151	159	187	197	142	88	346	234	151	115	155	155	173
Specific Conductance	108	120	138	132	118	79	64	276	118	113	236	132	136
pH(moles/l)	7.6	7.6	7.8	7.6	7.5	7.2	7.3	7.6	7.8	7.9	8.2	7.8	7.7
Boron	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.2	0.1	0.1
Fluoride	0.1	0.1	0.2	0.2	0.2	0.0	0.1	0.1	0.2	0.1	0.1	0.2	0.1
Lead	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Selenium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hexavalent Chromium		0.00							0.00				0.00
Arsenic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Iron	0.07	0.09	0.08	0.09	0.09	0.07	0.09	0.10	0.17	0.05	0.04	0.06	0.08
Manganese	0.00	0.00	3.7	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.31
Magnesium	2	2	4	2	2	2	1	6	2	2	5	2	3
Copper	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.02	0.01
Calcium	11	13	14	13	11	8	7	17	10	10	14	12	12
Zinc	0.02	0.03	0.03	0.02	0.02	0.01	0.02	0.02	0.04	0.00	0.02	0.01	0.02
Phenol		0.001							0.005				0.003
Color(units)	8	12	9	10	9	18	8	15	6	5	9	7	10
Sampling Date	01/18	02/15	03/15	04/19	05/17	06/14	07/19	08/16	09/20	10/18	11/15	12/20	

* Specific Conductance is in microsiemens/cm (microsiemens are equivalent to micromhos; to obtain millisiemens, divide by 1000). All other constituents are in milligrams per liter except pH, % Sodium, and as otherwise noted. Each value is obtained from a once-monthly sample.

** Values correlated from continuous EC.

TABLE 30: CALIFORNIA AQUEDUCT AT TEHACHAPI AFTERBAY

1983

Constituents*	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL Average
** Total Dissolved Solids	79	88	100	100	87	68	59	124	132	89	96	99	93
** Total Hardness	38	41	46	46	41	34	30	55	58	42	44	46	43
** Chlorides	5	7	9	9	7	4	3	14	15	7	8	9	8
** Sulfates	15	16	18	18	16	13	11	23	24	16	18	18	17
** Sodium	10	12	14	14	12	8	7	18	20	12	13	14	13
** % Sodium(%)	37	38	40	40	38	35	34	42	43	38	39	40	39
** Specific Conductance	128	143	163	165	142	109	93	205	219	144	157	162	153
Specific Conductance pH (moles/l)	114	140	151	139	128	78	68	259	162	131	120	142	136
								9.7	7.7	7.7	7.4	7.0	9.0
Boron	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.2	0.1	0.1	0.1	0.1	0.1
Fluoride	0.2	0.1	0.2	0.3	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2
Lead	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Selenium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hexavalent Chromium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Arsenic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Iron	0.04	0.04	0.02	0.01	0.00	0.05	0.03	0.06	0.08	0.03	0.02	0.03	0.03
Manganese	0.00	0.01	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
Magnesium	2	2	3	2	3	1	1	6	3	2	2	3	3
Copper	0.01	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.01
Calcium	11	15	15	14	12	8	7	16	12	11	11	10	12
Zinc	0.05	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.01	0.01	0.00	0.02	0.01
Phenol													
Color (units)	10	22	8	5	5	9	4	8	8	7	5	3	0.000
Sampling Date	01/20	02/17	03/17	04/21	05/19	06/16	07/21	08/18	09/22	10/19	11/17	12/21	8

* Specific Conductance is in microsiemens/cm (microsiemens are equivalent to micromhos; to obtain millisiemens, divide by 1000). All other constituents are in milligrams per liter except pH, % Sodium, and as otherwise noted. Each value is obtained from a once-monthly sample.

** Values correlated from continuous EC.

TABLE 31: PYRAMID LAKE AT ENTRANCE TO ANGELES TUNNEL

1983

Constituents*	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL Average
Total Dissolved Solids	182	226	237	273	312	275	212	232	253	282	296	244	252
Total Hardness	96	112	118	140	152	144	112	126	132	143	151	144	131
Chlorides	36	34	25	22	21	16	13	14	15	17	16	16	20
Sulfates	48	62	78	89	94	88	64	75	83	93	94	88	80
Sodium	32	33	28	27	29	25	19	21	24	25	26	24	26
% Sodium(%)	41	38	33	29	29	27	27	26	28	26	27	26	30
Specific Conductance	348	394	376	410	421	397	293	355	378	418	423	419	386
pH(moles/l)	8.0	7.4	7.8	7.7	8.5	8.3	8.2	8.7	8.2	8.1	7.8	8.2	8.1
Boron	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3
Fluoride	0.2	0.3	0.4	0.3	0.3	0.4	0.4	0.4	0.2	0.4	0.4	0.5	0.4
Lead	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Selenium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hexavalent Chromium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Arsenic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Iron	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manganese	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
Magnesium	10	12	10	12	14	12	9	10	11	13	13	13	12
Copper	0.01	0.01	0.01	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Calcium	22	25	31	36	38	38	30	34	35	38	39	36	34
Zinc	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00
Phenol													
Color(units)	4	4	6	7	6	3	4	4	2	6	4	3	4
Sampling Date	01/25	02/15	03/17	04/21	05/17	06/14	07/19	08/16	09/21	10/18	11/15	12/20	

* Specific Conductance is in microsiemens/cm (microsiemens are equivalent to micromhos; to obtain millisiemens, divide by 1000). All other constituents are in milligrams per liter except pH, % Sodium, and as otherwise noted. Each value is obtained from a once-monthly sample.

TABLE 32: CASTAIC LAKE AT OUTLET WORKS

1983

Constituents*	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL Average
Total Dissolved Solids	258	253	279	295	308	333	295	333	336	298	316	292	300
Total Hardness	135	132	138	140	145	152	156	156	166	162	159	159	150
Chlorides	54	53	50	48	46	44	45	44	44	39	37	38	45
Sulfates	73	74	75	77	79	83	87	92	93	92	90	91	84
Sodium	46	45	42	42	42	42	43	42	41	38	37	38	42
% Sodium(%)	42	42	39	39	38	37	37	36	34	33	33	34	37
Specific Conductance	493	495	471	445	483	486	420	513	520	497	493	492	484
pH(moles/l)	7.7	8.0	8.3	9.0	8.4	8.5	8.5	8.6	8.8	8.3	7.9	8.3	8.5
Boron	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.3	0.2	0.3	0.3	0.3	0.3
Fluoride	0.3	0.3	0.4	0.3	0.3	0.4	0.4	0.4	0.5	0.4	0.4	0.5	0.4
Lead	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Selenium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hexavalent Chromium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Arsenic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Iron	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Manganese	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Magnesium	14	14	14	14	14	15	16	15	16	15	15	15	15
Copper	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Calcium	31	30	32	33	35	36	36	38	40	40	39	39	36
Zinc	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00
Phenol													
Color(units)	3	3	4	5	3	2	2	2	3	6	3	2	0.000 3
Sampling Date	01/25	02/14	03/17	04/19	05/17	06/13	07/18	08/16	09/19	10/17	11/15	12/19	

* Specific Conductance is in microsiemens/cm (microsiemens are equivalent to micromhos; to obtain millisiemens, divide by 1000). All other constituents are in milligrams per liter except pH, % Sodium, and as otherwise noted. Each value is obtained from a once-monthly sample.

TABLE 33: CALIFORNIA AQUEDUCT AT CHECK 59

1983

Constituents*	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL Average
**Total Dissolved Solids	72	67	79	82	76	50	46	45	137	90	67	89	75
**Total Hardness	37	35	40	41	39	28	26	25	61	44	35	44	38
**Chlorides	3	1	5	6	4	4	6	6	24	8	1	8	4
**Sulfates	11	10	12	13	12	7	6	6	23	14	10	14	11
**Sodium	11	10	12	12	11	7	6	6	23	14	10	14	11
**% Sodium(%)	38	38	39	40	39	35	34	34	45	41	38	41	38
**Specific Conductance	127	117	140	145	134	88	80	80	242	158	118	157	132
Specific Conductance pH(moles/l)	105	121	157	146	133	85	77	76	285	198	121	145	130
								9.4	9.1	7.7	7.5	7.0	8.9
Boron	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.2	0.1	0.1	1.0	0.1
Fluoride	0.2	0.1	0.2	0.3	0.2	0.1	0.5	0.2	0.2	0.2	0.1	0.2	0.2
Lead	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Selenium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hexavalent Chromium													0.00
Arsenic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Iron	0.04	0.05	0.02	0.01	0.02	0.02	0.02	0.06	0.03	0.04	0.01	0.02	0.03
Manganese	0.00	0.01	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.01	0.00	0.00
Magnesium	2	1	2	2	2	1	1	1	5	1	2	3	2
Copper	0.01	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Calcium	9	14	17	15	13	9	8	8	19	11	11	11	12
Zinc	0.06	0.01	0.00	0.00	0.01	0.00	0.00	0.01	0.01	0.00	0.00	0.02	0.01
Phenol													0.000
Color(units)	7	16	9	6	5	10	4	5	5	6	6	4	7
Sampling Date	01/19	02/16	03/16	04/20	05/18	06/15	07/20	08/17	09/21	10/19	11/16	12/21	

* Specific Conductance is in microsiemens/cm (microsiemens are equivalent to micromhos; to obtain millisiemens, divide by 1000). All other constituents are in milligrams per liter except pH, % Sodium, and as otherwise noted. Each value is obtained from a once-monthly sample.

** Values correlated from continuous EC.

TABLE 34: CALIFORNIA AQUEDUCT AT INLET TO MOJAVE SIPHON

1983

Constituents*	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL Average
**Total Dissolved Solids	109	113	108	101	102	79	75	66	85	101	69	82	91
**Total Hardness	52	53	51	49	49	40	39	35	42	49	36	41	45
**Chlorides	12	14	12	9	10	2	0	3	4	9	2	3	6
**Sulfates	17	18	17	16	16	12	11	10	13	16	11	13	14
**Sodium	17	18	17	16	16	12	11	10	13	16	10	12	14
**% Sodium(%)	42	43	42	41	41	39	38	37	40	41	38	39	40
**Specific Conductance	192	198	189	177	179	139	132	117	149	177	122	144	160
Specific Conductance pH(moles/l)	104	123	166	146	144	87	72	73	224	134	128	138	128
								9.7	8.8	7.9	7.4	7.1	9.1
Boron	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.2	0.1	0.1	0.1	0.1
Fluoride	0.1	0.1	0.2	0.4	0.2	0.1	0.2	0.1	0.1	0.2	0.0	0.2	0.2
Lead	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Selenium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hexavalent Chromium							0.01						0.01
Arsenic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Iron	0.03	0.03	0.02	0.02	0.03	0.02	0.00	0.04	0.03	0.04	0.02	0.01	0.02
Manganese	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00
Magnesium	2	2	2	2	3	2	0	1	3	2	2	3	2
Copper	0.01	0.01	0.01	0.01	0.00	0.00	0.02	0.00	0.01	0.00	0.00	0.00	0.01
Calcium	8	14	17	15	13	8	9	8	17	13	11	11	12
Zinc	0.08	0.00	0.00	0.01	0.02	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.01
Phenol													
Color(units)	9	20	12	6	5	12	7	2	3	7	5	3	0.000 8
Sampling Date	01/19	02/16	03/16	04/20	05/18	06/15	07/20	08/17	09/21	10/19	11/16	12/21	

* Specific Conductance is in microsiemens/cm (microsiemens are equivalent to micromhos; to obtain millisiemens, divide by 1000). All other constituents are in milligrams per liter except pH, % Sodium, and as otherwise noted. Each value is obtained from a once-monthly sample.

** Values correlated from continuous EC.

TABLE 35: SILVERWOOD LAKE AT OUTLET TO MOJAVE RIVER

1983

Constituents ^a	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL Average
Total Dissolved Solids	148	84	124	118	70	107	72	79	62	112	96	100	98
Total Hardness	62	53	48	50	49	40	36	33	36	45	52	48	46
Chlorides	28	20	8	8	7	3	4	5	4	10	9	10	10
Sulfates	24	19	13	12	11	7	6	5	4	9	10	11	11
Sodium	24	19	12	12	12	10	8	8	8	12	12	12	12
% Sodium(%)	45	43	34	33	34	34	32	33	32	36	32	34	35
Specific Conductance	254	208	156	158	152	126	109	101	112	152	162	160	154
pH(moles/l)	7.5	7.7	7.0	7.0		8.0	8.0	8.1	6.3	8.3	7.4	7.5	7.8
Boron	0.2	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.0	0.1	0.1	0.1	0.1
Fluoride	0.1	0.2	0.1	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2
Lead	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Selenium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hexavalent Chromium													0.00
Arsenic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Iron	0.02	0.02	0.03	0.03	0.02	0.03	0.01	0.01	0.04	0.00	0.02	0.01	0.02
Manganese	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.00	0.03
Magnesium	6	5	3	3	4	2	2	2	2	3	3	3	3
Copper	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Calcium	15	13	14	15	13	13	11	10	11	13	16	14	13
Zinc	0.00	0.01	0.01	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.19	0.01	0.02
Phenol													0.000
Color(units)	4	6	8	7	5	7	4	7	5	8	3	5	6
Sampling Date	01/19	02/15	03/16	04/21	05/17	06/14	07/19	08/17	09/20	10/18	11/22	12/22	

* Specific Conductance is in microsiemens/cm (microsiemens are equivalent to micromhos; to obtain millisiemens, divide by 1000). All other constituents are in milligrams per liter except pH, % Sodium, and as otherwise noted. Each value is obtained from a once-monthly sample.

TABLE 36: SILVERWOOD LAKE AT INLET TO SAN BERNARDINO TUNNEL

1983

Constituents*	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL Average
Total Dissolved Solids	128	111	129	129	85	109	69	74	64	127	93	104	102
Total Hardness	62	53	48	48	49	40	36	33	38	45	48	52	46
Chlorides	28	20	10	8	7	3	4	5	5	8	9	10	10
Sulfates	24	19	13	12	10	8	6	5	4	9	10	11	11
Sodium	25	19	12	12	12	10	8	8	8	11	12	12	12
% Sodium(%)	46	43	34	34	34	34	32	32	30	34	34	33	35
Specific Conductance	259	210	157	154	152	130	112	111	122	155	154	164	157
pH(moles/l)	7.1	8.0	8.0	7.0		8.1	7.6	8.0	6.5	8.7	7.5	7.9	8.0
Boron	0.2	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.0	0.1	0.1	0.1	0.1
Fluoride	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2
Lead	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Selenium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hexavalent Chromium													0.00
Arsenic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Iron	0.02	0.02	0.02	0.02	0.02	0.03	0.00	0.02	0.06	0.04	0.01	0.02	0.02
Manganese	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.06	0.03	0.00	0.00	0.01
Magnesium	6	5	3	3	4	2	2	2	2	3	3	4	3
Copper	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Calcium	15	13	14	14	13	13	11	10	12	13	14	14	13
Zinc	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.02	0.00	0.01	0.01	0.01
Phenol													0.000
Color(units)	4	6	7	8	4	7	3	8	5	12	3	4	6
Sampling Date	01/19	02/15	03/16	04/21	05/18	06/14	07/19	08/17	09/20	10/18	11/22	12/22	

* Specific Conductance is in microsiemens/cm (microsiemens are equivalent to micromhos; to obtain millisiemens, divide by 1000). All other constituents are in milligrams per liter except pH, % Sodium, and as otherwise noted. Each value is obtained from a once-monthly sample.

TABLE 37: DEVIL CANYON AFTERBAY

1983

Constituents*													ANNUAL Average
	JAN	FEB	MAR	APP	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	
**Total Dissolved Solids	148	133	108	103	104	97	85	79	83	99	104	102	104
**Total Hardness	60	54	44	41	42	39	33	30	32	40	42	41	42
**Chlorides	22	17	11	10	10	9	6	5	6	9	10	10	10
**Sulfates	24	21	16	16	16	14	12	11	12	15	16	15	16
**Sodium	21	18	13	12	12	11	8	7	8	11	12	12	12
**% Sodium(%)	44	42	39	38	38	37	35	34	35	38	38	38	38
**Specific Conductance	230	199	149	139	142	128	104	92	100	132	141	138	141
Specific Conductance pH(moles/l)	260	207	166	160	156	133	130	112 8.8	121 7.2	156 7.4	160 7.2	162 6.4	160 8.1
Boron	0.1	0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.1
Fluoride	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.1	0.2	0.2
Lead	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Selenium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hexavalent Chromium													0.00
Arsenic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Iron	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.06	0.03	0.02	0.01	0.02
Manganese	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.07	0.01	0.01
Magnesium	6	5	3	3	3	2	2	3	2	3	4	3	3
Copper	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.01
Calcium	15	14	14	15	14	13	11	10	12	13	14	15	13
Zinc	0.08	0.01	0.01	0.01	0.02	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.01
Phenol													0.000
Color(units)	3	7	8	7	4	7	3	3	3	5	5	5	5
Sampling Date	01/19	02/16	03/16	04/20	05/18	06/15	07/20	09/17	09/21	10/19	11/16	12/21	

* Specific Conductance is in microsiemens/cm (microsiemens are equivalent to micromhos; to obtain millisiemens, divide by 1000). All other constituents are in milligrams per liter except pH, % Sodium, and as otherwise noted. Each value is obtained from a once-monthly sample.

** Values correlated from continuous EC.

TABLE 38: LAKE PERRIS AT INLET

1983

Constituents*	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL Average
Total Dissolved Solids	205	191	201	206	207	224	187	210	189	189	181	175	197
Total Hardness	86	86	82	78	82	84	82	86	78	76	77	77	81
Chlorides	46	45	43	42	43	43	44	46	40	36	35	37	42
Sulfates	39	39	36	36	36	36	38	36	34	27	28	29	35
Sodium	37	36	35	34	36	36	36	36	33	30	30	30	34
% Sodium(%)	47	47	47	48	48	47	48	47	47	45	45	45	47
Specific Conductance	371	362	344	338	338	341	291	350	330	308	297	310	332
pH(moles/l)	7.9	9.2	9.2	8.5		9.2	9.0	8.6	8.1	7.3	7.7	7.8	8.8
Boron	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2
Fluoride	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.3	0.2	0.2	0.1	0.2	0.2
Lead	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Selenium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hexavalent Chromium													0.00
Arsenic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Iron	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00
Manganese	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Magnesium	10	10	9	8	9	9	9	10	8	8	9	9	9
Copper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Calcium	18	18	18	18	18	19	18	18	18	17	16	16	18
Zinc	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Phenol													0.000
Color(units)	3	5	3	5	4	5	4	3	5	5	4	3	4
Sampling Date	01/19	02/16	03/15	04/19	05/17	06/14	07/18	08/17	09/21	10/19	11/16	12/20	

* Specific Conductance is in microsiemens/cm (microsiemens are equivalent to micromhos; to obtain millisiemens, divide by 1000). All other constituents are in milligrams per liter except pH, % Sodium, and as otherwise noted. Each value is obtained from a once-monthly sample.

TABLE 39
WATER QUALITY
MINIMUM DETECTION CONCENTRATIONS
FOR TESTED SUBSTANCES*

	Detection Limits (ppm or mg/l)		Detection Limits (ppm or mg/l)
<u>CHLORINATED HYDROCARBON PESTICIDES & PCB'S</u>		<u>ORGANIC PHOSPHORUS PESTICIDES</u>	
Alachlor	.00001	Bidrin	.00001
Aldrin	.00001	Carbophenthion	.00001
Atrazine and/or Simazine	.00001	Crufomate	.00001
BHC	.00001	Demeton	.00010
Captan	.00001	Diazinon	.00001
Chlordane	.00001	Dioxathion	.00001
Chlorothalonil	.00001	Dursban	.00001
Chlorpropham	.00001	Ethion	.00001
		Ethyl Parathion	.00001
		Fenthion	.00002
Dacthal	.00001	Malathion	.00001
DDD	.00001	Methidathion	.00001
DDE	.00001	Methyl Parathion	.00001
DDT	.00001	Paraoxon	.00001
Dicofol	.00001	Phorate	.00003
Dieldrin	.00001	Phorate Sulfone	.00001
Difolatan	.00001	Phosmet	.00001
Diuron	.00001		
		<u>HERBICIDES & FUNGICIDES</u>	
Endosulfan	.00001	2,4-D + esters & salts	.00001
Endrin	.00001	2,4,5-T + esters and salts	.00001
Heptachlor	.00001	2,4,5-TP/Silvex + esters and salts	.00001
Heptachlor Epoxide	.00001		
Lindane	.00001		
Methoxychlor	.00002	MCPA	.00001
Nitrofen	.00001	Pentachlorophenol	.00001
PCB 1016	.00025	Tetrachlorophenol	.00001
PCB 1242	.00025		
PCB 1254	.00025	<u>MISCELLANEOUS COMBINATIONS</u>	
PCB 1260	.00025		
Perthane	.00001	CDEC	.00001
Pronamide	.00001	Thiobencarb	.00001
Propanil	.00001		
Toxaphene	.00025		

* Listed are those pesticides that would be detected by laboratory scans currently used for pesticide analysis, and the minimum concentration at which these substances can be detected is shown. Detected amounts from a quarterly sampling program are shown in Table 40.

**TABLE 40:
PESTICIDES IN CALIFORNIA AQUEDUCT
1983**

(in parts per million)

STATION	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
DELTA PUMPING PLANT												
Chlorinated Hydrocarbons					.00019			.00000			.00003	
Organic Phosphorous					.00000			.00002				
Herbicides					.00000			.00002			.00002	
Combinations of C,P, and N types												
DISCHARGE FROM O'NEILL P.P.												
Chlorinated Hydrocarbons		.00002			.00000						.00002	
Organic Phosphorous					.00000							
Herbicides		.00000			.00003						.00004	
Combinations of C,P, and N types												
NEAR KETTLEMAN CITY (Check 21)												
Chlorinated Hydrocarbons		.00007			.00056			.00002			.00002	
Organic Phosphorous					.00000			.00001				
Herbicides		.00000			.00000			.00004			.00004	
Combinations of C,P, and N types												
TEHACHAPI AFTERBAY												
Chlorinated Hydrocarbons					.00003			.00001			.00000	
Organic Phosphorous					.00013							
Herbicides												
Combinations of C,P, and N types											.00000	
C - Chlorinated Hydrocarbons P - Organic Phosphorous N - Organic Nitrogen												